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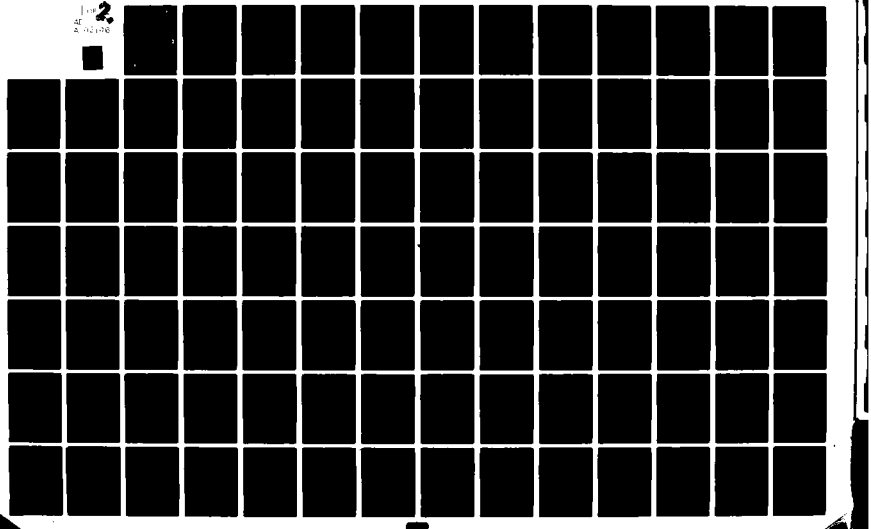

(1) LEVEL II



# (6) STOCKAGE POLICY ANALYSIS.

(9) Final Report.



OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
(Manpower, Reserve Affairs, and Logistics)





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# STOCKAGE POLICY ANALYSIS

## Final Report

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
(Manpower, Reserve Affairs, and Logistics)

August 31, 1980

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## Executive Summary

The Office of Management and Budget (OMB) review of the FY 1980 Defense Budget resulted in the preparation of several OMB staff issue papers citing possible "efficiencies" in management of the Defense Department. In particular, Issue Paper No. 10, entitled "Supply System Efficiencies" identified several areas where OMB believed improved management practices were possible. This paper concluded that the Department of Defense (DoD) should reassess certain existing supply policies and practices, emphasize incentives to improve inventory management controls and reduce certain inventories maintained as a "hedge" against unforeseen variations in usage. In response to the OMB issues, a Secondary Item Stockage Policy Analysis effort was initiated on August 13, 1979 by an Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics) memorandum which established a Joint Steering Group to oversee the analytical efforts of an in-house ad hoc Working Group. This Working Group, composed of representatives of the Components and OASD(MRA&L), was chaired by the Staff Director, Supply Policy and Programs Division, OASD(MRA&L). The Working Group, assisted by contractor personnel from C.A.C.I. Inc.-Federal of Arlington, Virginia, commenced their efforts in September, 1979.

In conjunction with the OMB staff, the Working Group identified the specific areas of supply management policies and practices which OMB believed required detailed review. It has been a consistent objective of this analysis to provide a positive, comprehensive response to the OMB issues. The Working Group believes this objective has been realized. The following provides a summary of the issues as stated by OMB and the Working Group responses to these issues.

Buy Quantity Adjustment. OMB believes that item managers can arbitrarily adjust procurement quantities and will often increase procurement and repair quantities above the level required.

> The study identified those data elements that impact buy and repair decisions and the capability of item managers to manu-

ally adjust these data elements. Analysis confirmed that item managers can and do change quantities; however, the changes are effectively controlled and ICP control procedures are adequate. A detailed review of item manager changes and procedural controls at the Army Tank-Automotive Materiel Readiness Command (TARCOM) revealed no significant problems.

Potential Excess and Contingency Inventory Levels. OMB believes that the amount of materiel categorized annually into potential excess and contingency inventory levels represents ten percent of new procurements and repair costs. They also believe the Department should determine the degree VSL/EOQ policies contribute to potential excess and contingency inventory levels.

In an attempt to measure the flow of materiel into potential excess and contingency inventory levels caused by the VSL/EOQ policies, a simulation by each Component was undertaken. Exact quantification could not be measured because of all the factors, such as pattern of historical demands and the accuracy of future program data, that impact the models. It was determined that long supply could have been caused by the forecasting model, the VSL/EOQ levels models, or both. The study recommends issuance of a VSL/EOQ policy for reparables and includes a proposed basic policy on demand forecasting. It also recommends a follow-on study on demand forecasting and advocates increased standardization in consumables management.

Additional Stockage Levels. OMB believes that current DoD policies do not provide incentives to minimize inventories such as insurance and numeric stockage levels. They also questioned the contribution any investment in the non-demand based inventories makes toward support objectives.

The issue concerning lack of incentives was confirmed as partially correct. However, analysis confirms that non-demand based inventories significantly contribute to support objectives. The study developed the basis for a new DoD Instruction that will standardize non-demand definitions and policies. It also recommends a "response time" measurement be used and development of improved models to permit better management of non-demand based items.

Weapon Systems Phase-Out. OMB stated that DoD does not have an effective system to adjust procurements of consumable items on phase-out of a weapon system, and that some type of notification system should be used.

The OMB concern regarding the impact of phase-out on long supply was substantiated. The study confirms the need for more emphasis in the use of program data and has developed a policy statement that requires Service initiatives for phase-out and interchange of information on phase-out to other supporting Components.

The OMB analysis which resulted in the above issues was accomplished based on a series of observations made by the several OMB staff and management officials during their FY 1980 spring budget review. These issues generally dealt with individual, often isolated, problem areas. To effectively respond to OMB, it was necessary for the DoD Working Group to expand the scope of the review to include a number of areas not directly addressed by OMB, but which were essential to a meaningful analysis of secondary item stockage policy.

Using the OMB issues as a basis, the Work Group's initial efforts were devoted to establishing specific areas of analysis and setting milestones for completion. This first step was completed in December, 1979 and was formally approved by the ASD(MRA&L) on December 4, 1979. Detailed milestones were established and approved by the Steering Group.

The specific areas of stockage policy identified for review were:

- Variable Safety Level and Economic Order Quantity (VSL/EOQ)
- Manual File Maintenance
- Non-Demand Based Stockage
- Weapon Systems Relationships

To accomplish its analysis in the most efficient manner, the Working Group was divided into three Sub-Groups, each of which was responsible for a major area, with a single Sub-Group covering VSL/EOQ and Manual File Maintenance.

The following summarizes the analysis, conclusions and recommendations of the Stockage Policy Analysis effort for each major area of review:

Variable Safety Level/Economic Order Quantity

An analysis of Variable Safety Level and Economic Order Quantity (VSL/EOQ) policy implementation was completed in response to two OMB issues: the Item Manager can arbitrarily adjust procurement quantities; and the volume of materiel being recategorized as potential excess and contingency stocks is ten percent of the volume of new procurement and repair. Since one method for adjusting procurement quantities is through the computation of the VSL/EOQ, the Working Group first documented the Components' implementaton of the policy as contained in DoD Instruction 4140.39 "Procurement Cycles and Safety Levels of Supply for Secondary Items." This effort led to the identification of areas in which the Components differ significantly in the interpretation and implementation of the policy. As a result, the Working Group has recommended a number of changes be made to DoD Instruction 4140.39 which are designed to achieve greater uniformity among the Components.

Documentation of VSL/EOQ values, parameters and constraints, as well as the management controls over these variables, has also been completed. From the documentation, the Working Group concluded that the management controls used by the Components in establishing VSL/EOQ parameters and constraints are adequate.

To determine the extent to which the current VSL/EOQ models contribute to long supply, the Working Group tasked each Component to perform a simulation effort to measure the increase in long supply over time. The Working Group concluded that the VSL/EOQ models, as currently implemented by the Components do contribute to long supply; however, the magnitude cannot be precisely stated as it is a function of several factors including: the demand trend for items, the variance of inventory levels over time; and the method of demand forecasting utilized by the models. Final resolution of the long supply issue is dependent on accomplishment of the demand forecasting study recommended by the Working Group.

*Manual File Maintenance*

Documentation of the data elements susceptible to manual adjustment and the levels of approval authority for the adjustments has been completed by the Working Group. In an effort to determine the impact of manual adjustments on procurement quantities, the Working Group performed a Management Review at the Armys' Tank-Automotive Materiel Readiness Command (TARCOM). The review revealed no significant problems. However, the Working Group fully realized that the situation at TARCOM may not be considered representative of all DoD Inventory Control Points (ICPs) in terms of responding to the OMB concern that item managers arbitrarily adjust procurement quantities.

To assure OMB that only valid manual adjustments are made in the future, the Working Group recommends that all DoD Components develop a systems product that would identify items with manual adjustments impacting the procurement quantity. Such a product could be utilized by ICP Management to control manual adjustments. The Working Group

also recommends that each Component headquarters conduct periodic management reviews of its ICPs to include review of manual adjustments. Implementation of these recommendations by the Components will not, and should not, eliminate manual adjustments. However, it signifies the intent of the DoD logistics community to tighten control of manual file maintenance and insure that only valid adjustments are made.

Non-Demand Stockage Policies

The Working Group documented current definitions and policies relative to non-demand based stockage, quantified the value of inventory in this category, determined the contribution this type of inventory makes toward support objectives, developed proposals for standardized DoD policy and identified areas for follow-on study.

Documentation of current definitions and policies for non-demand based stockage reveals a high degree of inconsistency among the Components in terms of definitions. The OMB issues which indicated that DoD policy in this area does not provide incentives for the Components to minimize inventory investment is partially correct in that there is insufficient policy in this area; however, the OMB quantification of "hedge stock" inventories failed to consider the different types of inventories and, thus, dissimilar problems associated with these inventories. Quantification of non-demand based inventories based upon more precise and uniform definitions developed by the Working Group revealed a DoD inventory investment of $3,536 million compared to the OMB calculation of the Department's investment in "hedge stocks" of $4,721 million.

The Working Group identified "response time" as the primary support objective to evaluate the contribution of non-demand based inventories. A one-time analysis was performed to determine the contribution non-demand based inventories make toward response time. The results of this analysis indicated that "response time" was reduced by 36.2% based upon DoD's current investment in non-demand based inventories which

only amounted to 13.8% of DoD's total investment in secondary items. Therefore, the Working Group concluded that non-demand based items contribute significantly to materiel support objectives as measured by "response time".

The Working Group has also developed proposed uniform non-demand based stockage policy for future implementation by the Components and has recommended development and implementation of a more sophisticated "response time" model for determining range and depth of these types of inventories.

The Working Group has also developed a concept paper to be used as the basis for establishing uniform essentiality coding for secondary items within each Component.

Weapon Systems Relationship

The Working Group reviewed Components' procedures for phase-in and phase-out of weapon systems, documented the use of essentiality coding in the requirements determination process, documented historical trends of long supply inventories, quantified the major contributing factors resulting in long supply inventories, documented current procedures and management actions related to weapon systems management and developed a concept paper on weapon system management of secondary items to be used as a baseline for future discussions and policy concerning this management concept. To accomplish these tasks, the Working Group reviewed the use of program data in the requirements determination process and the methods used to maintain weapon systems application data for items managed.

The Working Group reviewed Components' procedures for weapon systems phase-in and phase-out and concluded that more explicit recognition of weapon system phase-out is required for computing requirements. The Group has developed a policy statement that requires additional actions to be taken during weapon sytems phase-out and also requires that phase-out information be provided by the Services to DLA

and other supporting Components. The documentation of the use of application data, program data, and essentiality coding in the requirements determination process was also accomplished. Trends in long supply inventories have been documented and factors contributing to long supply inventories have been identified. Management actions and procedures related to weapon systems management were reviewed and are documented in the concept paper on Weapon System Management of Secondary Items.

In addition to the specific conclusions and recommendations which resulted from this analysis, the Working Group has determined that the underlying cause of many of the problems associated with current stockage policies is the practice of independent and often inconsistent implementation of DoD policy among the several Components. While it is recognized that policy implementation must often be tailored to the missions, systems and other unique circumstances of individual Components', it is the considered opinion of the Working Group that significant improvement in the development and implementation of DoD inventory management and stockage policies is being achieved through the mechanism of the joint OSD/Component Working Group. It is recommended, therefore, that to insure the timely implementation of the specific recommendations of this Report and of related follow-on study efforts, that OASD(MRA&L) take appropriate action to develop a permanent mechanism which will facilitate the most effective use of in-house DoD and contractor resources during future policy formulation efforts.

# Chapter I

## Introduction

### A. Problem

During the review of the Fiscal Year 1980 Defense Budget by the Office of Management and Budget (OMB), the Department of Defense (DoD) was assessed a reduction in Fiscal Year 1980 resources on the basis of "supply efficiencies" that OMB believed could be implemented by DoD. In Fiscal Year 1981 OMB expressed their continued concern with the timeliness of DoD's implementation of their "efficiency" issues and indicated their strong interest in insuring positive DoD actions on these matters. One of the "efficiencies" addressed by OMB related to the need for improvements in DoD's secondary item stockage policies. A detailed statement of the issues developed by OMB is presented in Chapter II. In response to the issues raised by OMB, the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics) initiated a comprehensive analytical effort to review secondary item stockage policies and management practices. The findings, conclusions and recommendations from this effort are contained in this Report.

### B. Objective

The original objective of this analysis effort was to develop a definitive response to the "supply efficiency" issues raised by OMB in their Fiscal Year 1980 budget review and to preclude further issues in this area in subsequent years. Although this original objective has been consistently retained, a further objective evolved as the analysis progressed. This collateral objective was to document, evaluate and recommend appropriate revisions to improve DoD policies, procedures and Component implementations across a significantly wider range of related stockage policies than those originally associated with the OMB issues.

## C. Approach

On August 13, 1979, the ASD(MRA&L) issued a memorandum establishing the Secondary Item Stockage Policies Steering Group to oversee the analytical efforts of an in-house ad hoc Working Group (Appendix A). The Steering Group was chaired by the Deputy Assistant Secretary of Defense (Supply, Maintenance and Services) with the Deputy Assistant Secretary of Defense (Requirements, Resources and Analysis) as the Sub-chairman. Representatives from the Components comprised the Steering Group memberships.

The Working Group, composed of representatives of the Components and OASD(MRA&L), was chaired by the Staff Director, Supply Policy and Programs Division, OASD(MRA&L). The Working Group was assisted by contractor personnel from C.A.C.I. Inc.-Federal of Arlington, Virginia. (Appendix B) The Working Group commenced their efforts in September, 1979. These initial efforts were devoted to establishing the specific areas of analysis and setting milestones for completion. This first step was completed in December, 1979 and was formally approved by an ASD(MRA&L) memorandum of December 4, 1979 (Appendix C). Detailed milestones were established and approved by the Steering Group (Appendix D). Chapter III contains a complete description of the analysis effort. Chapter IV provides a summary of conclusions and recommendations of the Working Group.

## Chapter II

## Office of Management and Budget's "Supply Efficiency" Issues

The OMB review of the FY 1980 Defense Budget resulted in the preparation of several OMB staff issue papers citing possible "efficiencies" in management of the Defense Department. In particular, Issue Paper No. 10, entitled "Supply System Efficiencies" identified several areas where OMB believed improved management practices were possible. This paper concluded that DoD should reassess certain existing supply policies and practices, emphasize incentives to improve inventory management controls and reduce certain inventories maintained as a "hedge" against unforeseen variations in usage. In conjunction with the OMB staff, the Working Group identified the specific areas of supply management policies and practices which required detailed review. These are summarized into four categories:

### A. Buy Quantity Adjustments

OMB accepted as valid the basic policy on VSL/EOQ as contained in DoD Instruction 4140.39. However, they believed that item managers throughout the Department can arbitrarily make upward adjustments to procurement quantities which were developed in accordance with this policy. The OMB issue paper further contends that item managers naturally tend to make upward adjustments since current item management incentives strongly emphasize avoiding "out of stock" conditions. OMB believes that improvements are needed in management controls over adjustments that can be made to either variable elements within the mechanized requirements computation process, to manually file maintained data input or to system output products.

### B. Potential Excess and Contingency Retention Inventory Levels

OMB estimates that the amount of materiel categorized annually into potential excess and contingency retention inventory levels represents

about ten percent of annual new procurement and repair costs. Despite their acceptance of the validity of the VSL/EOQ concept as the basis for stockage of selected "hedge" stocks, OMB believes, that as an undesirable side-effect, current VSL/EOQ policies contribute in some degree to the annual flow of materiel into potential excess and contingency retention inventories. The OMB issue paper proposes that some reductions of "hedge" stocks are possible which, in turn, would reduce the growth of potential excess and contingency retention stockage.

C. Additional Stockage Levels

OMB contends that current DoD policies do not provide incentives to minimize inventories maintained as a "hedge" against shortages due to changes in item usage. In their "hedge" stock category, OMB included variable safety level stocks, non-demand based items such as insurance and numeric stockage objective items and a category of intermediate level stocks unique to the Air Force - "negotiated stock levels." OMB specifically questioned whether investment in non-demand based inventories makes any significant contribution to support objectives such as supply availability. OMB believes DoD's investment in these inventories can be reduced through more restrictive selection with a negligible impact on readiness. The OMB issue paper proposed development of a meaningful measure of the contribution of non-demand based investment.

D. Weapon System Phase-Out

OMB believes that DoD does not have an effective system to adjust procurements of consumable items during the phase-out of a particular weapon system. As a result, consumable materiel is often procured even though demand for the materiel will not develop and the materiel will become obsolete. This build-up of obsolete materiel will, in turn, impact on the obsolescence rate used in future requirements determination calculations. OMB contends that DoD should be using some type of notification system for weapon systems phase-out in the consumable requirements determination process.

The OMB analysis which resulted in the above issues was accomplished based on a series of observations made by the several OMB staff and management officials during their FY 1980 spring budget review. These issues generally dealt with individual, often isolated, problem areas. To effectively respond to OMB, it was necessary for the DoD Working Group to expand the scope of the review to include a number of areas not directly addressed by OMB, but which were essential to a meaningful analysis of secondary item stockage policy. It has been, however, a consistent objective of this analysis to provide a positive, comprehensive response to the OMB issues. The Working Group believes this objective has been realized. The matrix on the following page provides a summarized cross-reference from the issues as stated by OMB to the Working Group responses to these issues. A page-numbered reference to the detailed issue discussions is also provided.

MATRIX OF OMB ISSUES, OASD(MRA&L) RESPONSES AND PAGE REFERENCES OF STOCKAGE POLICY ANALYSIS

| ISSUES | RESPONSES | PAGE NO. |
|---|---|---|
| A. Buy Quantity Adjustments<br>. Item managers can arbitrarily adjust procurement quantities | . Analysis concluded control procedures are adequate.<br>. Change should be made to DoD Instruction 4140.39 to require Headquarters approval authority.<br>. Item managers can change quantities, however changes are effectively controlled.<br>. On-site review at TARCOM revealed no significant problems. | Chapter III, pages 3-2, 3-4, 3-11, 3-12, 3-13, 3-14<br>Chapter IV, page 4-1 |
| B. Potential Excess and Contingency Levels<br>. Materiel categorized annually into potential excess and contingency equals 10% of procurement and repair value<br>. Determine degree VSL/EOQ contributes to potential excess/contingency levels. | . Simulation by each Component<br>. Inventory and forecasting model does contribute to long supply.<br>. Quantification not possible at this time; forecasting model is primary contributor.<br>. Need standardization in consumables management.<br>. Issue VSL/EOQ policy for reparable items.<br>. Recommend Demand Forecasting study.<br>. Issue policy on Demand Forecasting. | Chapter III, pages 3-14, 3-15, 3-16 3-17, 3-18, 3-19 3-20<br>Chapter IV, pages 4-5, 4-6 |
| C. Additional Stockage Levels<br>. Policies do not provide incentives to minimize "hedge" inventories.<br>. Quantify contribution of Non-Demand inventories to support objectives.<br>. Reduce investment by more restrictive selection.<br>. Develop measure of Non-Demand inventory contribution. | . OMB's quantification of "hedge stocks" includes diverse inventory categories.<br>. Issue DoD Instruction providing Non-Demand definitions/ policies.<br>. Lack of incentives partially correct<br>. Non-Demand inventories significantly contribute to support objectives.<br>. Use "response time" measurement to determine contribution.<br>. Implement "response time" model to permit improved development of Non-Demand Based Stockage. | Chapter III, pages 3-20, 3-21, 3-24 3-25, 3-26, 3-30 3-34<br>Chapter IV, pages 4-7, 4-8, 4-9 |
| D. Weapon Systems Phase-out<br>. No system to adjust consumable procurements on phase out.<br>. Should use notification system on phase out of weapons systems. | . OMB concern is substantiated regarding impact of phase-out on long supply.<br>. More emphasis needed in use of program data.<br>. Issue policy statement regarding initiatives for phase-out and providing information to other Components. | Chapter III, pages 3-36, 3-37, 3-38 3-42, 3-43, 3-50<br>Chapter IV, pages 4-10, 4-11 |

## Chapter III

## Working Group Tasking

The initial efforts of the Working Group included the realignment of the issues raised by OMB into workable segments for purposes of developing analytical tasks and allocating available personnel resources to accomplish the tasks in a timely and productive manner.

The Working Group, with Steering Group approval, identified four major areas for review and analysis: Variable Safety Level and Economic Order Quantity (VSL/EOQ), Manual File Maintenance, Non-Demand Based Stockage Policies and Weapon Systems Relationships. The Working Group was then organized into three Sub-Groups with one Sub-Group responsible for both VSL/EOQ and Manual File Maintenance. The Working Group identified specific tasks and sub-tasks to be accomplished within each of the major areas. Each Sub-Group worked independently to accomplish its assigned tasks. The Working Group assembled periodically to review the progress of each Sub-Group and to assure that the necessary interfaces were accomplished. The Working Group Chairman then presented the accomplishments and issues requiring resolution to the Steering Group.

The results of the Working Group efforts were expanded significantly beyond the original OMB issues. This Chapter, together with its associated Annexes, details the analysis accomplished by the Working Group.

In addition to the specific conclusions and recommendations which resulted from this analysis, the Working Group has determined that the underlying cause of many of the problems associated with current stockage policies is the practice of independent and often inconsistent implementation of DoD policy among the several Components. While it is recognized that policy implementation must often be tailored to the missions, systems and other unique circumstances of the individual Components, it is the considered opinion of the Working Group that

significant improvement in the development and implementation of DoD inventory management and stockage policies is being achieved through the mechanism of the joint OSD/Component Working Group. It is recommended, therefore, to insure the timely implementation of the specific recommendations of this Report and of related follow-on study efforts, that OASD(MRA&L) take appropriate action to develop a permanent mechanism which will facilitate the most effective use of in-house DoD and contractor resources during future policy formulation efforts.

## A. Variable Safety Level/Economic Order Quantity

An analysis of Variable Safety Level and Economic Order Quantity (VSL/EOQ) policy implementation was undertaken in response to two Office of Management and Budget (OMB) issues: the Item Manager (IM) can arbitrarily adjust buy quantities and the volume of materiel being recategorized as potential excess and contingency stocks is 10% of the volume of new procurement and repair. Although the first OMB allegation could have been interpreted narrowly as the IM's ability to change file data and computerized procurement recommendations, the Working Group elected to broaden the interpretation to include an examination of the DoD Components implementation of DoD Instruction 4140.39 (Task No. 0001) and the control over the setting of parameter and constraint values embodied in the implementation models (Task No. 0002). In response to the second allegation, the Working Group decided to undertake two tasks to determine the volume of recategorization of materiel to long supply and the underlying causes for the excess materiel. One effort involved a manual examination of a sample of items in long supply; this was accomplished by the Weapon Systems Relationships Sub-Group (Task No. 0003). The other effort involved a simulation to determine the impact of the forecasting and VSL/EOQ models on long supply (Task No. 0003). The following subsections describe the tasks in more detail, summarize the analytical effort and outline the findings, conclusions and recommendations.

## Task No. 0001 - Components' Implementation of DoD Instruction 4140.39

The first task undertaken in the area of VSL/EOQ was multi-faceted and consisted of: determining how the Components had implemented the VSL/EOQ policy of the Office of the Secretary of Defense (OSD) as reflected primarily in DoD Instruction 4140.39 "Procurement Cycles and Safety Levels of Supply for Secondary Items"; identifying areas of implementation inconsistent with OSD policy and significant differences among the Components' mechanized implementation of VSL/EOQ policy; seeking the solution or a means to the solution of identified problem areas; and proposing recommendations for policy statements and longer range efforts.

Documentation of each DoD Component's implementation of VSL/EOQ policies is provided in Annex A (Part 1 and Part 2). Analysis of the information in the documentation reveals inconsistencies among the Components' implementation in the following areas: the use of nonrecurring demands in forecasting; unit replacement cost used in VSL/EOQ computations; range rule for selection of demand based items for stockage; formula for computing obsolescence rate; budget formulation and budget execution goals; constraints on VSL values; constraints on EOQ values; use of procurement leadtime variances in computing leadtime demand variances; probability distributions of leadtime demand; methodology of forecasting demand; the use of serviceable returns in forecasting and as requirements offsets; and accounting for the frequency of procurement reviews. Upon completion of discussion and study of each of the twelve areas, an issue paper was prepared which contained the subject, OSD policy on the subject, a description of the Components' implementation of the OSD policy, a discussion of the subject, and recommendations for policy statements and longer range study efforts. The issue papers are provided in Annex A (Part 3).

Two general, overall conclusions were drawn by the Working Group. First, lacking specific guidance from OSD in the area of reparable items management, the Components have implemented significantly different methodologies for computing VSL/EOQ values for reparable items.

Second, even though OSD has provided guidance in DoD Instruction 4140.39 and other policy issuances, there is room for increased standardization among the Components in certain areas of consumable item management.

Based on these general conclusions and on those drawn from discussion of the subjects of the issue papers, recommendations provided in the succeeding paragraphs are made. These recommendations are broken into groupings reflecting changes to DoD Instruction 4140.39, actions to be accomplished in the near term and tasks requiring a longer term effort.

The following are recommended changes to DoD Instruction 4140.39 and a brief description of the rationale for the recommendations:

> "The forecasting of demand to be used in computing inventory levels should utilize, as a base, all demand observations except those for which the requisitions are clearly a one-time acquisition or for those requirements which are forecasted on a basis other than historical demand. One-time acquisitions refer to such demands as retail war reserve requisitions, initial outfitting requisitions, allowance change requisitions, etc." The rationale for this recommendation is that there are differences among the DoD Components with regard to the types of demand included in the forecasts. Navy uses only demands coded recurring by the customer, while the other Components utilize varying degrees of nonrecurring demand as well as recurring demand in their forecasting routines.
>
> "The replacement cost used in the VSL/EOQ models should be estimated using the unit cost of the last contract of approximately the same order quantity size with authorized escalation factors applied for the time period since that contract award until the present time of levels computation." This statement is recommended as a means of standardizing the replacement

cost used in the models. Currently some of the DoD Components utilize the standard unit price, while others use the last contract unit cost or some derivative of it.

"The range rule for demand based items to be used during and after the demand development period (DDP) should be the DoD Instruction 4140.42 Difference in Cost (COSDIF) equation or an OSD-approved alternative model in which all costs and parameters are consistent with the costs and parameters used in DoD Instruction 4140.39 for the depth model." Currently there is no stated OSD policy regarding a range rule for the stockage of items following the DDP. As a result, the DoD Components have implemented various rules for range criteria. These range from simple fixed rules to more complex rules which provide variable results dependent upon the value of key item characteristics.

"The holding cost rate is to be applied to the average inventory position (i.e., R + Q/2) and the obsolescence rate portion of the holding cost rate will be computed as an average rate over at least a five year period as follows:

$$\frac{\Sigma(\text{Disp}) + \Sigma(\Delta\text{PE}) + \Sigma(\Delta\text{CRS}) - \Sigma(\text{Returns w/o credit})}{\Sigma(\text{IP})}$$

Where:

| | | |
|---|---|---|
| Disp | = | Disposals; transfers to PDO |
| ΔPE | = | Change in Potential Excess between successive stratifications |
| ΔCRS | = | Change in Contingency Retention Stock between successive stratifications |
| Returns w/o Credit | = | That portion of materiel returned to the wholesale level from lower echelons without credit which has become part of the disposal, potential excess or contingency retention stocks |

IP = Average inventory position (on-hand plus on-order assets)

This obsolescence rate computation should be applied to as detailed a breakdown of the inventory as possible. If the breakdown is not to the individual stock number, it must be recognized that this factor is an average across the breakdown and should be tempered for such considerations as the remaining life of the applicable weapon systems, planned equipment modifications, etc." The current policy is clearly inadequate since it calls for obsolescence rates to be computed as the ratio of disposals to inventory. Resource limitations may inhibit actual disposals so that excess assets become increases to the potential excess and/or contingency retention categories. For these reasons, some of the DoD Components have developed alternative formulas to the DoD Instruction 4140.39 formula, while others have continued to use the formula despite its recognized shortcomings.

"The computation of the leadtime demand variance used in safety level and re-order point computations should consider both the variability of demand and the variability of procurement leadtime." Since DoD Instruction 4140.39 and other DoD policy issuances do not address the computation of leadtime demand variance, most of the DoD Components have not specifically accounted for the variability of procurement leadtime in their formulas for computation of the leadtime demand variance. Clearly the variance of leadtime demand is a function of the variance of procurement leadtime as well as the variance of demand.

"The safety level is to be constrained to no more than three standard deviations of leadtime demand." Currently, DoD Instruction 4140.39 constrains the safety level to no larger than the lesser of mean leadtime demand or three standard deviations of leadtime demand. Analysis outlined in the issue

paper on this subject shows that lifting the mean leadtime demand constraint is cost-beneficial.

"If procurement reviews are not conducted at least daily or as transactions occur, the procurement leadtime forecast utilized in computing the re-order point should incorporate the average interval of time occurring from when assets actually reach the re-order point to the subsequent procurement review operation. For simplicity, one-half of the average interval between procurement reviews may be used. This leadtime additive value is to be treated as part of the administrative leadtime." The model of DoD Instruction 4140.39 implicitly assumes operation in a continuous review environment. That is, the requirements and the asset position are known at all times. Furthermore, the model assumes that when assets fall to the reorder point, an order will be placed immediately for the order quantity. Most of the systems implemented by the DoD Components are periodic review systems rather than continuous review systems. These systems will continue to exist until the Components obtain ADP hardware adequate to meet timely inventory management requirements.

The following actions are recommended for the near term:

"A study should be undertaken to resolve underlying issues in the area of demand forecasting in order to formulate and promulgate a policy directive. Underlying issues include: types of demand to be included in the forecasting base; methodology (i.e., arithmetic averaging, exponential smoothing, etc.); time base for collecting observations; frequency of forecasting; forecasting leadtime demand variance; use of program relationships. In addition, such a study should address the issue of which probability distribution(s) provides the most realistic distribution of leadtime demand. The study should apply to both reparable and consumable items." There is no OSD policy directive in this area. As a result,

there are several different methods of demand forecasting in use by the DoD Components. The different methods, if used on the same item, could lead to different forecasts and thus different inventory stockage levels.

"A policy statement should be issued by OSD which states: Inventory Control Point (ICP) response time will be the recognized performance measure for budget formulation and execution at the wholesale level. OSD should convene a study group to recommend appropriate response time goals for ICP performance and promulgate goals as part of the Consolidated Guidance." The model of DoD Instruction 4140.39 is a response time model (i.e., time-weighted requisitions-short); however, the current performance goal against which the model is measured is not a response time measure. Rather, the measure used in budget and Program Objective Memorandum (POM) development is requisition fill rate, which has no time dimension as does response time. Clearly the measure should be changed to conform with the model or the model changed to conform with the measure. The recommendation is with the former.

The following tasks are recommended as longer term efforts:

"OSD should formulate and promulgate VSL/EOQ policy for reparable (exchangeable) items, as has been done for consumable items via DoD Instruction 4140.39. This policy should address, in addition to the areas addressed in DoD Instruction 4140.39, the repair problem as well as the procurement problem; obsolescence rates; and the treatment of serviceable and unserviceable returns in the requirements determination process." Currently there is no OSD policy directive on requirement determination for reparables.

"OSD should undertake an effort regarding the use of serviceable returns in the requirements determination process

which: (1) tasks each Component to study the problem of forecasting serviceable returns and utilizing such forecasts in requirements computations; (2) tasks each Component to present the findings, conclusions and recommendations of its study to OSD; (3) results in a policy statement by OSD upon analysis of the Components' studies and the impact of the demand forecasting effort." Currently there is no OSD policy directive on the use of serviceable returns forecasts in requirements determination processes.

"Due to difficulties within the Components of meeting real world resource constraints regarding the volume of procurement actions resulting from use of the VSL/EOQ model and constraints of DoD Instruction 4140.39, OSD should undertake a study to determine a policy which promulgates the most cost-beneficial means of providing required materiel support while meeting resource constraints." The model of DoD Instruction 4140.39 implicitly assumes that sufficient Inventory Control Point (ICP) and stock point resources (e.g., manpower, O&M funding, ADP services) are available to meet the inventory control policy of the model. That is not the case, particularly in regard to the number of procurement actions generated. To inhibit the volume of such actions, the DoD Components have sought approval (primarily through the budget formulation process) to raise the minimum EOQ constraint above the three months' demand specified in DoD Instruction 4140.39. Such procedures may not be the most cost-effective means of accommodating the resource constraint.

"The issue of obsolescence should also be addressed in conjunction with the development of weapon systems management concepts and new inventory control models. Also, consideration should be given to resolving the aspect of the time dependency of obsolescence (i.e., the probability of obsolescence over time after item or weapon system introduction)." The current methodology of computing the obsolescence rate

is to determine a value for some universe (generally a large universe) of items. That obsolescence rate is not likely to be representative of many of the items in the universe because of such factors as weapon systems phase-out, equipment modification, etc. Clearly, items on weapon systems approaching phase-out should have a much higher obsolescence rate than new items entering the supply system.

Task No. 0002 - VSL/EOQ Values, Parameters, Constraints and Controls

The second task completed as part of the VSL/EOQ effort was to identify the parameters and constraint values used by the ICPs in their implementation of VSL/EOQ policy, to determine the controls over values, to determine the adequacy of those controls, and to propose recommendations for policy statements.

Each Component documented the parameters and constraints for which values can be changed, the currently used values for those parameters and constraints, the activity which determines the values, and the review and approval authority required prior to use by the ICPs. This documentation is provided in Annex A (Part 2). In addition, members of the Working Group conducted an on-site review at the Army Tank - Automotive Materiel Readiness Command (TARCOM). The purpose of the review was two-fold: to review manual file maintenance procedures and controls, which are discussed later in the Manual File Maintenance section, as well as controls over VSL/EOQ parameter and constraint values.

Since review and approval procedures are in place in the command structure above the ICP level of each DoD Component, the Working Group concluded that the Components' control procedures over the values of parameters and constraints are satisfactory. During the on-site review, it was verified that the values of the parameters and constraints used at TARCOM are being reviewed and approved by the Department of Army Materiel Development and Readiness Command Headquarters (DARCOM). An issue paper, which discusses the VSL/EOQ parameters and constraints, is provided in Annex A (Part 3).

To insure adequacy of control by the DoD Components in the future, it is recommended that OSD issue a change to DoD Instruction 4140.39 which states: values of key parameters and constraints, utilized in the computation of safety level and procurement cycle requirements and determined at a level of authority below the Component logistics headquarters (e.g., DLAHQ, AFLCHQ, NAVMATHQ/NAVSUPHQ, DARCOMHQ), are to be reviewed and approved by the Component logistics headquarters.

## Task No. 0003 - Impact on Long Supply

The third task was to determine the validity of the OMB allegation that 10% of the materiel procured by DoD Components becomes excess to needs. This task was undertaken by means of a simulation by each Component. Basically, the steps in the simulation were these:

Select a large sample of demand based consumable items that have long demand history records,

Utilize inventory control simulators which emulate the forecasting and VSL/EOQ models used by the Components in implementing DoD Instruction 4140.39,

Simulate the respective wholesale supply system operation on the item sample with regard to filling customer demands, periodically forecasting and setting inventory levels, and procuring materiel via contracts, and

Provide output statistics concerning the dollar value of procurements, the dollar value of long supply assets, the requisition fill rate, and the average days delay (customer wait per requisition) at six month intervals during the simulation.

A series of simulation runs were conducted at various inventory level parameter (shortage cost) settings to determine if increases to safety levels increase the procurement of materiel which migrates to long sup-

ply. Detailed documentation, of the scope and method of study, findings and conclusions drawn from the simulation runs, and recommendations, is provided by each DoD Component at Annex A, Part 3.

The simulation runs confirm that the models used by the DoD Components in implementing OSD policy do contribute to the generation of long supply assets. The magnitude of the contribution could not be precisely stated as it is a function of several factors including: the demand trend for the items (i.e., increasing, decreasing or steady); the magnitude of the inventory stockage levels and how they change over time; the method of forecasting used; and the VSL/EOQ model in use. That is not to say that current OSD policy is not the "best" policy or that a particular Component's forecasting methodology and VSL/EOQ models are not "best". The answers to those questions should be provided by a study which examines alternative policies, methodologies and VSL/EOQ models. In each Component's simulation runs, long supply was generated. Since the simulations (except for DLA's) began in a balanced position of assets to requirements, the long supply could only have been generated because the forecasting methodology does not accurately forecast demands, the models inaccurately measures leadtime and variances or the VSL/EOQ models produce inventory levels that exceed the true need.

In order to isolate the impact of the VSL/EOQ model (i.e. safety level) from the impact of the forecasting methodology, a simulation run was made with a fixed zero safety level. Comparison of the long supply from this run with the long supply from the variable safety level runs revealed the zero safety level run produced a very high percentage of the amount of long supply from the other runs, especially that of the run with parameter settings normally used by the ICPs. Furthermore the simulations of the Army and Air Force covered items during a long period of declining demand. These simulations commenced at or during the Vietnam War era and continued into CY 1979. Simulation over that period greatly tried the capability of the demand forecasting methodology to accurately forecast the declining demand. These conditions led

the Working Group to conclude that the forecasting methodology is the dominant factor contributing to long supply, particularly in periods of declining demand.

The simulations also showed that increasing the safety level investment (via increases to VSL parameters) increases the probability of generating long supply. Although this was evident across all Components' simulations, it was most pronounced in the Navy and DLA simulations where the contribution of forecasting declining demand to long supply did not markedly mask the impact of varying the safety level investment. The Navy and DLA simulations did not include a high proportion of items with declining demand trends.

Although the results of the simulations lead to the conclusion that the Components' models do contribute to long supply, the following points must be kept in mind:

The contribution to force readiness at the risk of contribution to long supply is a key underlying issue. The simulation studies show clearly that there is a trade-off between readiness (as measured by requisition fill rate and average days delay in filling a requisition) and the amount of long supply. The questions are: (1) what are acceptable cost-benefits in terms of readiness and long supply and (2) are there alternative policies and models which achieve the desired readiness at a lower degree of long supply than existing models?

The degree of contribution cannot be quantified because the models impact depends on many factors not the least of which is the pattern of historical demands and the accuracy of future program data (e.g., flying hours).

Since the studies did not include a comparison of models, it cannot be concluded whether the models in use today do or do not contribute to long supply to a greater degree than alternative models. That conclusion would have to be drawn from a much broader study.

As a result of discussions between Working Group members and the OMB representative, the Working Group was requested to determine if data bases could be exchanged among the Components and simulated to evaluate the differences among the Components' models. After a detailed examination of the data base formats and the differences among the simulation models by members of the Working Group, it was concluded that it was not feasible either to exchange the data bases or to exchange the models (or portions of the models) without a significant cost in systems analyst and programming resources. Such a concentrated effort could not be accomplished prior to established deadlines without delaying the required simulations in response to OMB's basic allegation. If an evaluation of the differences among the Components' models is desired, it is recommended that such an evaluation be accomplished as part of the various long range studies recommended under Task No. 0001.

B. Manual File Maintenance

Another issue was the concern expressed by OMB that item managers throughout the Department can arbitrarily adjust procurement quantities and, in most cases, such adjustments are in an upward direction. In order to respond to this issue, the Working Group initially determined the methods by which item managers can adjust procurement quantities. One obvious method is by direct adjustment of the buy quantity itself. However, the same result can also occur indirectly through adjustment of data elements that in turn, cause a restatement of requirements and thus, procurement quantities. Since there is no uniform supply system within DoD, the data elements associated with this latter method are not consistent among the Components. Therefore, the initial task became one of documenting, by Component, these various data elements.

A related task was documentation of the levels of approval authority or controls placed on the manual adjustment process by the Component. Through this effort, the Working Group intended to show that even though manual adjustments are permitted, each Component has a means for controlling this process to insure that only valid adjustments are made.

Documentation of control procedures does not, however, insure that they are being followed by the Component Inventory Control Points (ICPs). Therefore, the Working Group decided to perform Management Reviews to determine if the procedures were working properly or if item managers were, in fact, arbitrarily adjusting procurement quantities. In addition, if arbitrary adjustments were being made, the Working Group wanted to determine their impact on the supply system.

The three tasks established to respond to this issue are discussed in the following paragraphs.

Task No. 0001 - Data Elements Susceptible to Manual Adjustment

As stated earlier, a major concern expressed by OMB was the ability of item managers throughout DoD to arbitrarily adjust procurement quantities. Given that the procurement quantity itself can be adjusted, this task centered on adjustments that come about in an indirect manner as a result of adjustments to other data elements that in turn impact the procurement quantity. As an example, adjustment of such data elements as the demand rate, safety level, leadtimes, and reorder cycle would likely result in a change to the procurement quantity.

The initial step in addressing this task was the Components documentation of the individual data elements which, when manually adjusted, would have an impact on the procurement quantity or other supply decisions. This documentation effort led to the identification of 133 such data elements; 21 for Army, 23 for Navy, 56 for Air Force, and 33 for the Defense Logistics Agency. For each data element, the documentation included the title, definition, application within the supply system, its dimension, i.e., number of positions, alpha/numeric, etc., and any appropriate remarks.

Once the data elements were identifed, the Working Group attempted to match, by definition, data elements that were common among the Components. Very little success was achieved from this effort, due primarily to the differences in Component supply systems. It was then

determined that data elements would be grouped into specific categories for comparison purposes. Such categories as assets, demand data, item essentiality, leadtimes, pricing, and safety level were established. Should additional information be desired, the detailed documentation is provided in Annex B, Sections 1.0 through 5.0.

The Working Group analysis reveals that all Components authorize item managers to adjust individual data elements, thereby permitting them to influence an item's procurement quantity. This capability is essential since item managers are expected to react rapidly to changing conditions regarding the items managed. Often, an item manager has information regarding his items that cannot be comprehended sufficiently by the automated systems and therefore manual adjustments become necessary.

Inability to react to these changing conditions could have an adverse impact on supply system performance and ultimately, materiel readiness. It is stressed however, that even though the item manager has this ability, it is controlled by the approval authority process that exists within each Component and is described in the next task.

## Task No. 0002 - Levels of Approval Authority

The purpose of this task was to determine whether sufficient controls exist within the Components to refute the OMB concern that procurement quantities are arbitrarily adjusted by item managers.

To address this task, the Components were requested to document the levels of approval authority for manual adjustments as they currently exist at each ICP. A synopsis of the current practice follows:

Army: Essentially, there are no controls placed on the actual act of making a manual adjustment. Item Managers may make adjustments they deem necessary. Review occurs at the time of a supply decision, i.e., procurement, repair, cutback, disposal. The level of review depends on the dollar value of the supply decision. Low-level item managers are

permitted to approve relatively low dollar value decisions while increasing dollar values require higher level review and approval. As an example, a GS-09 item manager at the Missile Materiel Readiness Command (MIRCOM) can approve supply decisions up to a dollar value of $5000, GS-11 approves up to $10,000, Section Chief - $75,000, Branch Chief - $100,000, Division Chief -$500,000, Director - above $500,000. However, the dollar value of approval authority varies between ICPs.

Navy. Item Managers are responsible for the accuracy of file data elements. Therefore, manual adjustments are initiated to correct erroneous file conditions and do not require specific approval by any higher authority. Through the use of various ADP products, ICP Management and Headquarters review teams perform periodic spot-checks of file data to monitor progress in maintaining an accurate data base. As with the Army, the accuracy of file data is reviewed at the time of a supply decision. The level of approval authority is based on the dollar value of the supply decision and varies by ICP.

Air Force. Item managers make manual adjustments in order to insure accuracy of requirements data. There is no review of individual file maintenance changes. Review occurs at the time of a supply decision. The level of approval authority depends on the dollar value of the supply decision and is standard among the various Air Logistics Centers. The maximum dollar value of approval for an item manager is $1,500, Unit Chief - $5,000, Section Chief -$20,000, Branch Chief - $100,000, Division Chief - $500,000, Director -$1,000,000, Commander - over $1,000,000. The Air Force, like the Navy, conducts periodic management reviews to insure validity of requirements and asset data.

DLA. As with the Military Services, DLA has no controls over individual manual adjustments. Review is at the time of a supply decision. The level of approval authority depends on the dollar value of the supply decision and, like the Army and Navy, varies among the ICPs.

For further information regarding the levels of approval authority for manual file maintenance adjustments, detailed documentation is contained in Section 6.0 of Annex B.

Among all Components, the approving authority over a particular supply decision has responsibility for the validity of data elements affecting that decision, including those adjusted by the Item Manager. So, while manual adjustments can be made, the Item Manager realizes that such action must be justified in order to obtain approval of the resulting supply decision. Therefore, based strictly on analysis of the Component documentation, one could conclude that contrary to the OMB contention, Item Managers cannot arbitrarily adjust procurement quantities. Before reaching such a conclusion however, the Working Group chose to perform a management review to insure that an ICP's actual operation was consistent with that documented. Also, to the extent possible, the Working Group wanted to determine whether manual adjustments have an unwarranted impact on procurement quantities.

Task No. 0003 - Impact of Manual File Maintenance Adjustments

To insure compliance with documented procedures and to determine the impact of manual adjustments on procurement quantities, the Working Group initially planned to conduct a Management Review of at least one ICP per Component. Faced with serious time constraints, the Steering Group authorized a Management Review at a single ICP and directed that results be reported to them prior to any additional reviews being conducted. The Working Group conducted the initial Management Review at the U.S. Army Tank-Automotive Materiel Readiness Command (TARCOM) located in Warren, Michigan.

In preparation for the review, the Working Group developed the format for a "system product" to be produced by TARCOM that would identify manual adjustments existing at the time of the review. Specifically, the "system product" provided a stock number identification of items with manual adjustments to data elements that would impact the requirements determination process. It also identified the manager of each item and provided statistical summaries by management level, i.e., Section, Branch, Division.

Selected members of the Working Group visited TARCOM in April 1980, to perform the Management Review. From the "system product", a sample of items with manual adjustments was selected and interviews conducted with individual item managers as well as various levels of management. The Working Group findings from this review were as follows:

The system product was quite useful in identifying manual adjustments and would be an effective tool in controlling them. TARCOM management personnel stated that the product would be of great assistance to them in the future.

Actual TARCOM operation was consistent with that documented under Tasks 0001 and 0002.

Manual adjustments were considered valid and therefore had no unwarranted impact on procurement quantities. Several instances were found in which the adjustments resulted in a reduction to the procurement quantity thereby at least partially refuting the OMB contention that adjustments result in increased procurement quantities.

In terms of the total stocked items managed by TARCOM, less than 2% had manual adjustments to such data elements as the demand rate, safety level, reorder cycle, and program data which could impact procurement quantities.

Some ADP system problems were detected for which TARCOM has submitted appropriate system change requests to the Army's central system design agency. Many of the manual adjustments were necessary in order for item managers to "work around" these problems.

The Working Group concluded from the review at TARCOM that the benefits to be gained from additional reviews of this type would be marginal. For a review to be accomplished, the ICPs would first have

to identify items with manual adjustments. This would require the ICPs to develop a product similar to that prepared by TARCOM. Further, it was concluded that, even if additional reviews were conducted and significant problems were found, the most likely result would be a tightening of controls over the manual adjustment process. Therefore, the Working Group, in their report to the Steering Group recommended that no additional reviews be conducted but that the Components be required to develop system products that would permit identification of items with manual adjustments and would provide a tool for their control. Such products should be utilized by ICP Management on a recurring or as required basis to insure compliance with Component and DoD policies. In addition, the Working Group recommends that each DoD Component headquarters conduct periodic Materiel Management Reviews of its ICPs, to include review of file maintenance. The various audit agencies should also be informed of the existence of such a product so that it could be utilized during appropriate reviews of the requirements determination process.

Implementation of these recommendations by the Components will not and should not eliminate manual adjustments. However, it will signify the intent of the DoD logistics community to tighten control of manual file maintenance and insure that only valid adjustments are made.

Future actions include initiation of an OSD Memorandum formally directing the Components to implement the Working Group recommendations. The Components should then conduct periodic management reviews of their ICPs and report any significant problems to the Working Group, its successor, or to OASD(MRA&L).

C. Non-Demand Based Stockage Policies

In their review of the so-called "hedge stocks", OMB included stockage of both non-demand based insurance and numeric stockage objective (NSO) items and inventories in the supply system used to satisfy variable safety level requirements. While accepting at least the concept of demand based variable safety levels, OMB questioned the validity of

stocking non-demand based items in terms of the expected return on this investment. In developing their analysis, the Working Group assigned a separate Sub-Group to examine non-demand based stockage. To accomplish this analysis and to respond to the OMB allegations, four tasks were identified: the documentation of current definitions and policies used within the Department and the quantification of non-demand based inventories (Task 0001); the identification of an appropriate materiel support objective and the measurement of the contribution non-demand based inventory investments makes toward attaining that materiel support objective (Task 0002); the development of DoD non-demand based stockage policies (Task 0003); and the identification of areas that require further efforts (Task 0004).

In performing their analysis, it was necessary for the Working Group to review definitions and management policies currently in effect, to extract quantitative data from available data sources, to determine acceptable and usable measures of performance and to compare non-demand based stockage policies as currently implemented within each Component and to identify inconsistencies among the several Components. The results of these efforts led ultimately to the development of proposed uniform definitions for DoD-wide application, comparative quantification of current non-demand based stockage for each Component, development of a recommended performance measure for non-demand based items, the drafting of proposed new policy statements applicable to non-demand based items and the identification of future efforts to further improve DoD-wide management of non-demand based items.

## Task No. 0001 - Definitions, Current Policies and Quantification

The initial effort included in this Task was the documentation of current definitions and policies used by the Components for managing non-demand based items and the determination of any inconsistencies among the Components. The detailed documentation of the Components current policies and procedures is contained in Annex C. It includes current definitions, selection criteria, review and classification procedures, requirements levels determination and stratification criteria.

The Working Group members independently documented their respective Component's definitions and current policies and procedures for managing non-demand based items. Initial analysis by the Working Group indicated, however, that a comparison of non-demand based with demand based items would be necessary, particularly as the analysis progressed to the milestone of quantifying inventory investment and the relative supply performance of certain categories of items. The Annex C documentation does, therefore, include discussion of both demand and non-demand based current policies and quantification of the total range of supply system inventories for each Component.

The Working Group analysis of the documentation of currently implemented Component definitions, policies and procedures for managing non-demand based items concluded that there are significant inconsistencies among the Components in these areas. Generally, these inconsistencies are not based on fundamental differences in item characteristics, but rather, they occurred as a result of independent policy and procedural development by each Component and an overall lack of specific DoD policy in the area of non-demand based items.

Definitions of non-demand based items, for example, range from rather concise criteria used by the Army to the Navy approach which makes no real distinction in defining demand versus non-demand based items. Selection criteria for determining non-demand based items is equally varied. In some instances source codes assigned during the provisioning process are used to select non-demand based items. In other cases, demand criteria, e.g., "less than 12 demands per year" are used to select non-demand based items. Each Component has also developed a unique set of rules to govern review and reclassification of non-demand based items. These rules vary widely and are usually tied to other considerations such as frequency of requirements computations, receipt of demands or development of buy or repair requirements. Reclassification does not occur in the Navy, however, as no distinction is made between demand and non-demand based items. Calculation of requirements levels and the stratification of requirements and inventories are equally diverse among the Components.

The Working Group analysis quickly indicated the need to develop uniform, meaningful definitions of non-demand based items for use by DoD Components. See Issue Paper No. 1, Annex C. Based on this conclusion the following definitions are recommended for DoD-wide application:

Stocked, Demand Based. An item which has sufficient demand to be stocked on a cost effective basis as dictated by the rules developed for VSL/EOQ.

Stocked, Non-Demand Based. An item which does not meet the demand-based criteria but is stocked for other reasons. This category of items would include insurance, numeric stockage objective and numeric retention items, as defined below:

Insurance. An essential item which has a "zero" inherent failure probability.

Numeric Stockage Objective. An essential item which has a "low" inherent failure probability.

Numeric Retention. A non-demand based item which has assets on-hand or due-in but does not have a requirements objective.

Non-Stocked. An item which is not stocked in the wholesale supply system. (Examples of non-stocked items include items coded for local purchase; items which are coded for central procurement, but are procured only on demand).

Inherent in the above recommendations is the application of an essentiality coding system to identify Non-Demand Based items. An "essentiality concept paper" has been developed and is included in Annex C.

The adoption of these definitions will provide the initial step toward the development of new or revised policies for management of non-demand

based items on a consistent basis throughout DoD. Policy Issues are addressed in Task No. 0003.

The OMB calculation of DoD's investment in "hedge stocks", as reflected in Annex C, amounted to $4,721.0 million. The initial OMB analysis failed to recognize the different types of inventories which they categorized as "hedge stocks". For example, OMB included DoD's investment in Variable Safety Level inventories in the"hedge stock" data even though their "supply efficiency" issues accepted the validity of the demand based variable safety level concept. Furthermore, OMB failed to recognize that the non-demand based portion of the "hedge stocks" was a largely non-homogeneous grouping of inventories; defined, computed and managed differently by each Component. As a part of its initial effort, the Working Group attempted to more consistently quantify the non-demand based portion of the overall secondary item inventory. This approach provides the basis for a comparative analysis of each of the Components' non-demand based inventories, for a more exact measurement of the contribution of these inventories to overall materiel support and for the development of more definitive non-demand based item management policies for DoD-wide application. It must be emphasized, however, that this quantification is based primarily on current Component definitions which in many instances are inconsistent with the recommended new definitions.

The collection of data represented a unique challenge to the Working Group members. OMB's quantification of "hedge stocks" included both demand and non-demand based inventory data which could not be readily segmented into meaningful categories. It was determined that the variable safety level portion of "hedge stocks" should be excluded from the non-demand based analysis. The remaining inventory data which OMB had extracted from the numeric stockage objective and other elements of the Component's annual budget submissions was not readily usable as a basis for comparative analysis. Furthermore, current management products did not adequately reflect demand versus non-demand based data. To obtain the needed data, numerous sources were used. These included stratification products, special runs from Inven-

tory Control Point data files, other periodic management reports and off-line data bases maintained as historical records or for use in operations research projects. For each Component, inventory investment, requirements objectives and value of annual demand data were manually compiled. The results of the quantification effort are shown in Annex C.

A summary of numbers of items and inventory investment in non-demand based items is provided below:

Non-Demand Based Inventory Investment

| Component | Number of Items | Inventory Investment ($M) |
|---|---|---|
| Army | 19,263 | $ 112.0 |
| Navy | 504,399 | 2,127.1 |
| Air Force | 109,025 | 892.6 |
| Defense Logistics Agency | 646,900 | 404.1 |
| Total | 1,279,587 | $3,535.8 |

The number of non-demand based items comprises 35.0% of all secondary items in DoD's wholesale supply system while the dollar value of inventory investments represents 13.8% of DoD's total investment in secondary items.

The Working Group analysis determined that non-demand based items do contribute to the overall satisfaction of demand for secondary items, but at a lower rate than demand based items. DoD-wide, non-demand based items account for 13.8% of inventory investment for secondary items, but satisfy about 5.0% of total value of annual demand. On the basis of annual investment in procurement and repair of non-demand based items, only about 10.1% of these resources are expended for non-demand based items. The analysis also showed that an additional 3.7% of the value of annual demand for secondary items is satisfied by items currently categorized as non-stocked. These items normally are acquired only as demand occurs, but for various reasons do, in fact, have stocks of assets on hand at the wholesale level. These non-stocked items account for 3.2% of the total secondary item wholesale inventory

investment. Upon implementation of the revised definitions previously described, the majority of the inventory for non-stocked items would be reclassified as numeric retention.

The Working Group analysis of the quantified inventory investment for non-demand based items strongly indicates that this investment probably cannot be fully justified on the basis of a value of demand versus value of inventory comparison. The analysis, in fact, did not attempt to make this conclusion. As non-demand based items inherently have low actual demand occurrences, justification of stockage must be made on the basis of factors other than relative values of demand. The Working Group concluded that recognition of essentiality factors in stocking non-demand based items and more accurately measuring the contribution of non-demand based stockage to supply and, therefore, operational performance are more logical bases for analysis of the merits of stocking non-demand based items.

Task No. 0002 - Contribution to Approved Support Objective

The second task required the identification of a meaningful measure of materiel support performance and the collection of data to determine the relationship between inventory investment and the chosen materiel support measure. In attempting to determine the support measure to be applied to non-demand based items, the Working Group examined approaches which would be applicable to the total range of supply system inventories and which could be readily implemented without major modifications to current data systems. Further, it was believed that a currently accepted performance measure, tailored to non-demand based items, would be most acceptable to the several DoD Components. In addition to the immediate question of responding the OMB's allegations regarding the contribution of non-demand based item investment to performance, the Working Group determined that a performance measure which could be utilized in a stockage model and expressed in terms of expected performance objectives would result in the most long term benefits for DoD.

Various alternatives for measuring materiel support performance were considered by the Working Group. These measures included requisitions filled, time on backorder and average days of supply response time. The conclusion reached was that a "response time" measure, used in conjunction with materiel support measures in existence today, would be the most appropriate measurement of supply performance relative to inventory investment. This measure was selected because "response time" is a meaningful measure which attempts to evaluate supply system performance from the viewpoint of the customer. Further, the response time measure incorporates other accepted performance measures applicable to wholesale stockage such as supply availability and average time awaiting parts.

Response time is defined as the average time elapsed from the receipt of a demand at the wholesale level until stock is made available for issue. Response time, as used in this analysis, does not consider bin picking or transportation time.

The "response time" computation considers the annual demand for a category of inventory, e.g., non-demand based, the supply availability, average time to fill an immediate issue, and the average time to fill a backorder. The specific formula used in calculating "response time" is as follows:

$$RT = ak + (1-a)\, b_t$$

Where:

| | | |
|---|---|---|
| $a$ | = | supply availability |
| $k$ | = | average time to fill an immediate issue |
| $b_t$ | = | average time to fill a backorder |

Using the above formula, Components developed their respective "response times" using current definitions of demand, non-demand based and non-stocked items and by developing a one-time compilation of FY 1980 data necessary to determine response times based on current inventory levels. Detailed documentation on the quantification of re-

sponse time is contained in Annex C. A summary of the results of this effort is reflected below:

Response Time in Days: Non-Demand Based Stocked

| Component | Demand Based | Non-Demand Based | Total* |
|---|---|---|---|
| Army | 22.6 | 51.6 | 25.4 |
| Navy | 17.7 | 14.8 | 18.5 |
| Air Force | 16.7 | 22.8 | 23.1 |
| Defense Logistics Agency | 8.4 | 13.1 | 21.4 |
| DoD-Wide | 12.3 | 15.4 | 21.9 |

* Includes non-stocked items.

As indicated previously, the objective of collecting "response time" data was to determine the contribution of non-demand based inventory investment to a chosen materiel support measure. This was accomplished by calculating what the "response time" for each Component would have been if no investment were made in non-demand based items. In essence, this would mean zero supply availability for these items and a "response time" equal to procurement leadtime. As an example, the response time for non-demand based items, if not stocked, is reflected below:

Response Time in Days: Non-Demand Based Not Stocked

| Component | Demand Based | Non-Demand Based Proc. Leadtime | Total* |
|---|---|---|---|
| Army | 22.6 | 244.8 | 25.6 |
| Navy | 17.7 | 384.0 | 101.9 |
| Air Force | 16.7 | 348.0 | 28.6 |
| Defense Logistics Agency | 8.4 | 217.0 | 27.3 |
| DoD-Wide | 12.3 | 301.7 | 34.3 |

* Weighted by annual demand for each category

Using the above data, the contribution of non-demand based investment is reflected below:

| | DoD-Wide |
|---|---|
| Days of Response Time if no investment had been made in Non-Demand Based inventories | 34.3 |
| Days of Response Time with current investment in Non-Demand Based inventories | 21.9 |
| % of Reduction in Response Time Resulting from Stockage of Non-Demand Based items | 36.2 |
| % of Non-Demand Based Inventory Investment to Total Inventory Investment (On-Hand and Due-In) | 13.8 |

While the Working Group's analysis demonstrated that non-demand based items do contribute to overall support objectives, there are additional "readiness" implications which also tend to support the need for some level of non-demand based item investment. For example, in the Navy, during the last two years, 32% of the stock numbers causing Not Mission Capable/Supply or Partial Mission Capable/Supply conditions for Navy aircraft were managed as non-demand based items. During the same period, 98% of the stock numbers causing Casualty Reports from Navy ships were managed and stocked as non-demand based items in the wholesale system (i.e., annual demand less than 4). While the Working Group did not pursue an extensive analysis of the impact of non-demand based items on operational availability, it appears obvious that some significant level of stockage for these items is mandatory to achieving acceptable levels of operational readiness.

While the above analysis only considers eliminating the investment in non-demand based items, the Working Group also considered the alternative of re-investing those resources in demand based items to determine the impact on supply performance. The re-investment alternative

has several problems. First, the current investment is a "sunk cost" and cannot be re-invested. Second, for the most part, items are procured as potential demand-based items and eventually are categorized as non-demand based items since demand did not materialize. Finally, any re-investment scheme would require a very high supply availability of demand based items to achieve the same "response time". This high level of supply availability for demand-based items would be needed to offset the reduction of the contribution to response time made by non-demand based items. In summary, the Working Group believes consideration of re-investment of current resources is inappropriate; rather, future investment decisions on demand or non-demand based items should be significantly improved if the recommendations of this Report are fully implemented.

Based upon the above, the Working Group concluded that the stockage of non-demand based items contributes significantly to the materiel support objectives of DoD as measured by "response time". Therefore, the OMB allegation that the contribution is questionable does not appear to be valid.

In view of the above, the following recommendation is provided:

> DoD should expand the use of a "response time" measurement in evaluating inventory stockage decisions for all items including non-demand based items.

The above recommendation, however, can only be implemented on a permanent basis after changes are made to the Military Supply and Transportation Evaluation Procedure (MILSTEP) program which would permit the Components to collect the data necessary to calculate "response time" on a continuing basis. Preliminary efforts are already underway to request these changes be made. A detailed discussion of response time measurement is contained in the Issue Paper No. 2 in Annex C. Another area which must be considered in the future is Consolidated Guidance. Current DoD objectives on materiel support measures are limited to those included annually in the Consolidated Gui-

dance, that is, wholesale supply availability. If the above recommendation is adopted, DoD should include "response time" objectives in Consolidated Guidance.

It must be recognized that the use of any measurement, including "response time", is useful only in evaluating past decisions in inventory investments and is not applicable to calculations of future levels of stockage. To assist in making such decisions, the Working Group recommended the development of a "response time model" which would facilitate the selection of the most effective inventory investment based on a desired response time objective. The details of this needed effort are included under Task No. 0004.

Task No. 0003 - Development of DoD Stockage Policies

This task required the analysis of current policies and the assessment of such policies with the objective of revising or developing new policies to improve the management of non-demand based inventories.

As indicated previously, the documentation of current policies and procedures is contained in Annex C. A detailed review of the documentation revealed that the management of non-demand based inventories among the Components was inconsistent. As a result, the Working Group has developed Issue Papers in areas requiring policy statements. The areas are selection criteria, requirements levels, review and classification, retention levels, stratification and management. The Working Group analysis drew upon desirable features of current policies and in several cases developed new recommended policies in their effort to develop a comprehensive proposal. As a vehicle for formalizing the proposed non-demand based policy statements, the Working Group recommends that a DoD Instruction be published which includes the new definitions described in Task 0001 and at a minimum incorporates the following proposed policies:

Selection Criteria - Provisioning. If an item is assigned a

"P" Source Code indicating the item is to be centrally procured, and is cost effective to stock as recommended by the VSL/EOQ Sub-Group, the item should be stocked as a demand based item. If the item is assigned a "P" Source Code, is not cost effective to stock, but is considered "essential" by the Component, the item should be stocked as a non-demand based item. Within this latter category, if the item has zero inherent failures, it should be considered an Insurance item. If the item has low inherent failures, it should be considered as a Numeric Stockage Objective item. If the item is assigned a "P" Source Code but is not cost effective to stock and not considered essential, it should not be stocked.

Selection Criteria - Replenishment. If an item is still assigned a "P" Source Code upon migration to the replenishment mode and is determined to be cost effective to stock, it should be classified as a demand based item. If an item is still assigned a "P" Source Code, is not considered cost effective to stock but is considered "essential" by the Component, it should be classified as a non-demand based item. Within this latter category, items should be classified as either Insurance or Numeric Stockage Objective items based upon the same criteria used above for provisioning items. If an item is still assigned a "P" Source Code, is neither cost effective to stock nor considered essential, but has assets on-hand or due-in, the item should be classified as Non-Demand Based - Numeric Retention. In this latter situation, if the item has no assets on-hand or due-in, it should be classified as a non-stocked item.

Requirements Objectives. The inventory requirements objectives, or depth, of non-demand based items will be set according to the classification of the item. Insurance items will have an objective equal to some fixed quantity such as a minimum replacement unit. Numeric Stockage Objective items will have an objective equal to either some fixed quantity

such as a minimum replacement unit or VSL/EOQ using historical demand data, projected failures or a catalog average adjusted by individual item demand rates. Numeric Retention items will have a zero requirements objective.

Review and Classification. All new items will be reviewed at the end of the Demand Development Period (two years) for migration to either the demand based or non-demand based category based upon the policy contained in the above Selection Criteria - Replenishment. Thereafter, each item classified as either Demand Based, Numeric Stockage Objective or Non-Demand Based - Numeric Retention will be reviewed at least annually. Items classified as Insurance will be reviewed whenever a "demand" occurs. All items will be reviewed for "essentiality" at least every six years.

Retention Levels. The Components will have the option to establish non-demand based retention levels based upon (1) an approved economic model or contingency retention criteria or (2) by making a conscious management decision to retain assets above the Approved Force Acquisition Objective. Management decisions will consider such factors as economy, potential usage, market availability, weapon system application, and storage capacity in deciding to retain assets.

When assets above the Approved Force Acquisition Objective are retained based upon a management decision, the retention level will be no greater than the on-hand and due-in assets less due-outs. These assets are categorized into a new retention category called a Numeric Retention Stockage Objective in the stratification process.

Stratification. While the policies on stratification of non-demand based items would be reflected in the Non-Demand Based Stockage Policies DoD Instruction, revisions to DoD Instruction 4140.24 would have to be made to incorporate

specific policy changes. Stratification summaries would be required for Demand Based - Provisioning, Demand Based - Replenishment, Non-Demand Based - Provisioning and Non-Demand Based - Replenishment. The requirement for an Insurance stratification summary would be cancelled. Additionally, two new lines would be added to the stratification tables. Intermediate Level Stockage Objective would identify the retail levels visible to the wholesale system and would be used by the Components, in the requirements development process. The Intermediate Level Stockage Objective would be within the Approved Force Acquisition Objective. The previously mentioned Numeric Retention Stockage Objective would be the other new line in stratification tables. This objective would be beyond the Approved Force Acquisition Objective. Another change to existing stratification procedures would be to re-name the existing non-recurring demand line to Planned Program Requirements.

Management. The development and issuance of a DoD Instruction on Non-Demand Based Stockage Policies will provide the necessary policy guidelines which do not now exist to improve the effective management of these types of inventories. The objective of these new policies is to facilitate the achievement of a given military support objective while minimizing inventory investment. Management of non-demand based items at the wholesale level must fully comprehend this objective.

The OMB contention that current DoD policies do not provide incentives for minimizing investment in non-demand based inventories is partially correct in that there are inadequate DoD policies for managing this type of inventory. However, it is believed that the recommendation to develop and issue a DoD Instruction which specifically addresses Non-Demand Based Stockage Policies and which includes the proposed new definitions is the first step to resolving the current deficiencies.

In addition to the above, the Working Group recommends that a DoD Instruction on "essentiality for secondary items" be developed and issued. A uniform essentiality coding system is necessary for the effective management of non-demand based items. Additionally, "essentiality" plays an important role in VSL/EOQ decisions. It is envisioned that the "essentiality concept paper" contained in Annex C be used as the point of departure for the development of the DoD Instruction.

Task No. 0004 - Identification of Areas for Follow-on Study

The last task in the Non-Demand Based Stockage Policies area included identifying the following future efforts required to implement the recommendations of this Report; identifying additional areas for future study and accomplishing a literature search of previous studies/publications in this area.

The development of a DoD stockage policy issuance for non-demand based items, incorporating the recommendations of this report is considered to be a matter of high priority. A separate and equally important effort is the implementation of the "response time" measure for both demand and non-demand based items.

It is considered essential that DoD pursue the development of a range/depth and simulation modeling technique which would use "response time" as the materiel support objective. The development of this technique would permit improved determination of requirements objectives for all secondary items. As mentioned, range and depth decisions would be made in the context of achieving a given support objective of response time. In addition, the development of a simulation capability would permit efficient trade-off decisions in the investment of resources in secondary items while achieving a given response time support objective. The response time model is discussed in detail in the Issue Paper No. 9 contained in Annex C.

Further effort is required to document and initiate the changes to MILSTEP to accomodate the "response time" measurement. These should

be submitted to the Military Standard Logistics Systems Office for implementation.

To insure more effective management of all secondary items and non-demand based items in particular, the Working Group strongly recommends the development and issuance of a DoD Instruction on "essentiality for secondary items". As the basic concept for essentiality coding has been developed by the Working Group, the follow-on effort in this area should consist primarily of the preparation, staffing and coordination of the DoD Issuance.

Other areas recommended for future study are: accommodation of any advances in weapon systems management in Non-Demand Based Stockage Policies; determination as to the applicability of the proposed retention policies developed by American Management Systems, Inc. to non-demand based items; and development of a demand forecasting technique for low demand items.

The literature search as required by this Task has been completed. The results are contained in Annex C.

D. Weapon Systems Relationships

An analysis of Weapon Systems Relationships was undertaken to respond to the Office of Management and Budget issue that the Services do not adjust stock fund item procurements in order to respond to major program decreases. The analysis of this area was accomplished by the completion of five tasks.

The first task, Program Data Usage, required the documentation and analysis of program data usage in support of weapon systems phase-in and phase-out and the documentation of the current and planned use of application files. This task documented the Components' use of program data for weapon systems phase-in/phase-out and provides the rationale and analysis that led to the development of a policy statement recommended for incorporation into a DoD Instruction. Components' applica-

tion files were documented as an adjunct to program data to assist at arriving at the policy statement.

The documentation and analysis of current and planned use of essentiality coding and its impact on requirements computations was the second task. This multi-faceted task, also being examined by the VSL/EOQ Sub-Group and the Non-Demand Based Stockage Policy Sub-Group, led to an examination of the Components' use and planned use of Essentiality coding. The Steering Group's recognition of the complexities involved leads to the recommendation to allow unilateral Component actions and a possible separate forum to investigate essentiality in toto.

The third task, Long Supply and Contributory Factors, was accomplished by an analysis of the current trends in long supply. The analysis performed enabled categorization of causes of long supply and substantiated OMB's concern that phase-out and significant phase-down of weapon systems are a primary cause of long supply. One hundred fifteen million dollars out of 320 million dollars of the sample selection of long supply items could be attributed to phase-out. This task also confirmed the need for the policy statement promulgated by Task 0001.

Documentation of the Components current Weapon Systems Management was the fourth task. As an integral part of the overall study, the Working Group felt a documentation of the Current Weapon Systems Management was important to the other tasks being studied. Each Component recorded the present system of management in a structured manner that enables comparability.

As Task 0004 progressed, and the variations and diversity of weapon systems management techniques of the various Components were encountered, it was decided to begin the development of a concept paper. A spectrum of Weapon Systems Management For Secondary Items has been developed to stimulate further exploration. This conceptualization is discussed in Task 0005.

## Task No. 0001 - Program Data Usage

The OMB contended that "the Services do not adjust stock fund item procurements in order to respond to major program decreases (weapon system phase-out)". The task group decided that any analysis relating to this contention must also consider DLA managed items and repairable items as well as Service managed, stock fund items. It also decided that phase-in represents a critical Defense management situation and, therefore, weapon system phase-in practices should also be reviewed during the analysis process.

In order to assess the validity of the contention and, at the same time, attempt to quantify its relative effect as a factor in the generation of long supplies, the procedures used by the DoD Components in dealing with phase-in/phase-out situations were documented and reviewed. Concurrently (as Task No. 0003), the Working Group obtained a sample analysis of long supply causes to establish the significance of phase-in (provisioning) and phasedown/phase-out.

When a weapon system is being newly introduced into an operational category, there are two main supply considerations; first, to ensure that there will be adequate supporting spares to provide continuity of training and peacetime operational deployment and, secondly, to prevent over-investment in items which will experience little or no failure. DoD Instruction 4140.42 stresses the trade-off of management intensity versus inventory investment during this introduction period. DoD Instruction 4140.42 requires the practice of austerity in introducing new items into the inventory. Initial stock lay-in in the retail system inventory and initial wholesale stockage decisions are intentionally limited to ensure this minimization of initial inventory investment, with the supply system responsiveness relied upon to overcome unexpected failures. Subsequent to the initial provisioning estimate of requirements, support of growing operational deployments of systems continuing in production over a several year period (the norm for important weapon systems) relies on the use of program data to accommodate the continuing increase in requirements. For the Services, this is largely done by use

of program factors and for DLA managed items, this can be done by means of Service-sponsored program forecasts (Special Program Requirements) in conjunction with the use of double exponentially smoothed forecasts which adjust to accommodate trends.

In view of the relatively austere investment practices during provisioning, and the lack of evidence in Task 0003 results to show any significant long supplies resulting from provisioning, the primary analysis effort was devoted to the phase-out situations.

Basically, there are two fundamentally different types of phase-out situations. The most common occurrence is that the weapon system will phase down gradually in the hands of the active operating forces over a multi-year period. During this period, demands on the inventory manager of applicable consumable and repairable items will reduce gradually as operational densities decline and pipeline stocks are consumed. At the same time, materiel returns will increase so that both procurements and repair actions can be reduced correspondingly. The gradually declining requirements can be anticipated through use of program data reflecting the declining density or flying hours or through use of an exponentially smoothed (trended) forecasting technique.

A more difficult phase-out situation occurs when the phase-out schedule is abrupt and only encompasses a relatively short time span of one to three years. During this phase-out period, the need for operational support continues and substantial excesses are unavoidable.

A separate but critical consideration accompanies any planned phase-out: the disposition of the replaced weapon system when it is returned by the operating forces. In many instances, assets phased out of active force inventories are used to augment the reserves and national guard units and/or offered for sale to friendly foreign governments with follow-on cooperative logistics support. In those instances, component parts utilization continues and the managing DoD Component is required to maintain support.

Further compounding the problems associated with phase-out is the extended leadtimes for acquisition of many required components. These leadtimes coupled with the uncertainties of phase-out schedules (due to engineering/production problems associated with replacing systems necessitating changes/extension of the schedules) present difficult problems to the supply system when leadtimes are greater than expected or phase-out schedules slip.

The factor of multiple use items must also be considered to preclude degradation of operational readiness of systems remaining in the force structure inventory that use a part/component of a weapon system being phased out.

The problems associated with phase-out also apply to weapons systems that experience a significant reduction in population or activity levels within a relatively short time span and then remain in the active forces inventory at a much lower level of activity than had previously been experienced. An example is the F-4 aircraft that experienced an approximate forty percent reduction in Air Force flying hour programs over a two year period.

Before summarizing the technique used by each component in anticipating increases or decreases in item requirements associated with phase-ins/phase-outs, it is first necessary to consider the system's capability to associate an item with the applicable weapon system(s). Each Military Service has at least a "top down" (every item, sub-assembly, assembly component of an individual weapon system) list of all components applicable to each weapon system. The Services also have an individual component to weapon system file, on-line, for at least the primary weapon system using each item managed within that Service. DLA does not have an application file (each item to each application) either off-line or on-line, nor do the Services generally have application records for DLA managed items applicable to their weapon systems except as an element of the off-line, "top down" list of all components of a particular weapon system. For additional detail on application files and their use in requirements forecasting, see Annex D beginning at page 1-24).

There are two primary methods used by DoD Components for considering decreasing or phase-out programs: use of program change factors based on program data or use of an exponentially smoothed or trended forecast. A synopsis of the methods used by the Military Services and DLA is described in the following paragraphs.

Program data is used by the Army throughout the life of all items to include a system phase-out data beyond which no further requirements are forecasted. From program data recorded in the Army's Commodity Command Standard System, Program Change Factors are calculated by dividing average quarterly program data (generally 24 months) into future program data by quarter. Forecasted demands to support recurring field requirements are developed by computing an average quarterly past demand (AQD) and multiplying that AQD by program change factors.

The Air Force uses program data throughout the life of all investment items and for selected expense items when the projected program deviates by plus fifteen percent or minus ten percent from the past two year average Those expense items not meeting the deviation criteria are projected by straight lining past demand.

The Navy uses program data throughout the life of all aircraft investment items except ground support equipment (GSE). All other aircraft items except GSE use program data during the demand development period (normally two years), after which single exponential smoothing is used. Aircraft support equipment is initially procured on a program data base. However, the program relationship is not retained during a demand development period. Ship parts, in general, do not use program data during demand development and subsequent support periods, however, single exponential smoothing is applied.

The Defense Logistics Agency applies double exponential smoothing to all items to forecast future demand. Although DLA has built the capability to use program data, this concept has not been tested in actual use. Efforts are underway to obtain necessary data for an initial test

effort during Fiscal Year 1981 from the Army for the XM-1 Tank. When DLA tests its concept for use of program data, it plans to apply the program factors to the forecasts developed by the double exponential smoothing technique. This is the only Component that will use program data in this manner.

Each of the Components' ICPs, in addition to the procedural applications, takes many off-line actions when a system is scheduled to be phased out. These actions take the form of meetings, conferences, telephone and written communications, wherein customers provide valuable data. Examples of data that should be considered are customers estimated decrease in requirements associated with reduction of weapon system density and additional assets available to be returned to the wholesale system. This data is then used in the development and execution of procurement/repair programs.

As discernable from the synopsis of the Components' use of program data, there is a diversity of the degree of its use. One fact becomes readily apparent; that program data is predominantly used by all services on investment or high cost items. The value of using program data is translatable to consumable items. Program data on phase-out or phase-down can effect procurement and repair decisions much faster than trend analysis and limit such decisions to parallel the expected decline of use of the weapon system. It was concluded that, although DoD Components are reacting in various ways and in varying degrees to reductions in requirements associated with weapon system phase-downs or phase-outs, more emphasis is needed to improve present management methods. It was decided that the development of an appropriate policy statement was a realistic short term goal to require increased emphasis and exchange of information between the Components. This conclusion is supported by the data and analysis of long supply causes (see Task 00[illegible]) which reflects phase-out as a predominant cause of long supply.

Since the use of program data vis-a-vis trending cannot be separated from the subject of demand forecasting, it should be addressed as part of a long range study of demand forecasting because time allotted for the current analysis did not allow for the extensive analysis required.

The following policy statement should be implemented by all Components as quickly as possible via an OSD memorandum and subsequent incorporation into a DoD Instruction.

> "The Services will identify significantly declining or total phase-out programs and develop Service initiatives that will include as a minimum: actions to reduce requirements forecasts, draw down unneeded peacetime and war reserve stocks, project increased returns, and modify repair requirements. Services will provide detailed information to DLA and other supporting Components that will enable them to initiate similar actions on items managed in support of significantly declining or phase-out programs."

Task No. 0002 - Item Essentiality Coding

The objective of this task was to determine the contribution of an essentiality factor to the improvement of secondary item requirements computation and to develop a proposed policy on the use of essentiality factors if warranted.

The approach selected to address this task was to document the use of essentiality coding in the current variable safety level calculations and/or the use of essentiality considerations in applying more intensive management to selected items; conduct a literature search for relevant materiel; and to investigate the feasibility of applying essentiality considerations to requirements computations.

The documentation of the current use of essentiality coding and/or considerations has been completed and is included in Annex D and briefly synopsized below.

All services have a capability to affect safety level investment for essentiality however, except for two instances, the essentiality factor is programmed as a constant and therefore negates itself in requirements computations by giving equal weight to all items managed by any given Inventory Control Point.

The only consideration given to essentiality weighted safety levels are by the Navy Aviation Supply Office for the TACAMO system (a navigational and communications system) and by the Defense Electronics Supply Center based on frequency of demand. The essentiality factor in the variable safety level calculation as prescribed by DoD Instruction 4140.39 causes this factor to be a multiple of the shortage cost. Therefore essentiality consideration can be given by varying the shortage cost even though the essentiality factor is programmed as a constant. From a systems standpoint it is not cost effective to program the capability of unique shortage costs for each item. The Navy Aviation Supply Office has implemented weapon system unique shortage costs for expense items and is planning to expand this concept to investment items in Fiscal Year 1983. Although the primary motivation for this action was to improve supply materiel availability for higher cost weapon systems through better distribution of safety level investment, the net effect is to infer essentiality considerations in safety level calculations at a weapon system level. The Army is investigating the feasibility of establishing weapon system unique shortage costs and expects to complete their analysis within the next six months.

DoD Instruction 4140.39 states that safety levels cannot exceed three standard deviations or mean leadtime demand whichever is the lesser. This mean leadtime demand constraint is discussed in Section A, Chapter 3. If the mean leadtime demand constraint is not removed, as recommended by the Working Group, programming essentiality into safety level calculations will have limited effect on improving individual item availability.

During provisioning, all Military Services identify essential items applicable to a new weapon system. All DoD Components use this information in the initial stockage decision. Individual Military Service processes for refining or expanding on the essentiality determination vary and will be described later. Generally, the purpose for essentiality coding is to establish the basis for some of the following types of actions in addition to the initial stockage decision:

a. Selection for war reserve requirements planning.

b. Use of a higher essentiality factor in the VSL computation. This practice is presently employed by the Navy and is planned for use by the Air Force.

c. Ranking by relative essentiality is used to prioritize repair scheduling for repairables.

d. Advise the inventory manager, when not also the weapon system manager, of the importance of individual items. This is of particular value when the inventory manager is of another Service or DLA.

A synopsis of the current practice follows:

Army. Essentiality coding is used to select items for war reserve requirements and to make initial stockage decisions. The Army is also planning to use such coding in tailoring authorized stockage lists.

Navy. In the wholesale system, essentiality is used in the initial stockage decision and in the replenishment requirements system as a basis for obtaining higher safety levels for selected weapon systems, e.g., support of FBM submarines, nuclear reactors, and TACAMO. For TRIDENT and SSPO (missile systems only) retail allowances, a relative essentiality ranking system of from 1 to 116 is used to determine both the range and depth of stock to be carried in the submarine.

Air Force. Air Force employs a three digit essentiality coding system for all Air Force managed items, in addition to the initial stockage decision based on essentiality. These codes are presently used for the selection of war reserve items and the prioritization of repair scheduling for repairable items. The Air Force plans to use this system in the allocation of war reserve funds and in the VSL computation.

DLA. When an item fails economic stockage criteria it will still qualify for stockage if designated essential by one or more of the military ser-

vices. In addition, approximately 190,000 different items managed have been identified by the Services as essential to first line weapon systems. These items are all stocked irrespective of demand and are given greater management attention, as well as full funding support during periods of funding austerity.

A listing of publications addressing essentiality, developed through a literature search is included in Annex D. A significant conclusion that can be drawn from the literature search of essentiality is that the treatment of this subject as an integral segment of requirements computations is a military unique subject. Cursory review of military publications indicate that most publications deal with determination of item essentiality rather than the use of essentiality in requirements computations. The only treatment of the subject in a civilian textbook, is by James W. Prichard and Robert H. Eagle, "Modern Inventory Management". The military studies are on file in OASD(MRA&L) for use in further review of essentiality.

In consideration of the magnitude of attempting to evaluate the impact of essentiality on the replenishment demand items managed by the Components, the Working Group proposed that a limited number of highly essential items be selected for application of essentiality in the variable safety level computations, and that a simulation effort be undertaken by each Component to determine the impact on safety level investment and materiel availability. In recognizing some of the complexities and problems associated with this effort, the Steering Group limited the scope of this proposal to identification of items and development of a common analytic approach. In attempting to investigate the feasibility of applying essentiality to a limited number of items, the complexities of establishing item essentiality and its relationship to files, system and requirement computations, made it impractical for the Working Group to adapt a single, palatable policy.

The Working Group has recommended that the Components continue the several on-going and/or planned programs in this area. If further policy is required, it should be addressed from a forum specifically established to address the complex subject of essentiality.

## Task No. 0003 - Long Supply and Contributory Factors

This task was to develop trends and causative factors that contribute to long supply.

Long supply was plotted as a percentage of on hand inventory and disposal was plotted as a percentage of potential excess. This was done for Fiscal Years 1977 through 1979. These fiscal years were selected to minimize the Vietnam impact on long supply.

This collection of data established that long supply has historically represented a significant portion of all Components' total inventory. Procurement and materiel returns are the two sources of obtaining materiel in the system which could eventually contribute to long supply. Through subjective analysis it was recognized that there are many causes of long supply:

Provisioning Buys

Technological Changes
(Population Decline/Obsolescence)
- Equipment/Weapon System Phase-out/Phase-down
- Equipment/Weapon System Modification

Planned Maintenance Changes
- Overhaul Cancellations/Reductions
- Modification Slippages

Recurring Demand Forecasting
- Sporadic Demand
- Change from projected activity levels

To objectively analyze the subjective causes of long supply it was necessary to review in depth a sample of long supply expense items at each of the Component's hardware ICPs. This review and analysis provided a quantified categorization of long supply. The following criteria were established for selection of the items; a sample of 200

items from each ICP; at least 10 units of on hand assets stratified to long supply categories and, total dollar value of at least $1,000 of long supply. Newly provisioned items were excluded from the sample to insure that sufficient time had elapsed prior to identifying them as being in long supply as a result of the provisioning process.

In the case of Army, Air Force and DLA, the item managers who currently manage the sample items determined the cause of long supply. Non-item manager analysts reviewed the Navy sample using file data. Since many of the items in the Navy sample had no activity in the last five years, it was not always possible for the analysts to determine the cause of long supply. This resulted in a disproportionate number grouped in the unknown category.

For comparability purposes, the dollar values and percentage of causes were categorized by four major reasons; Provisioning, Phase-out, Other and Unknown. The following chart summarizes the results of the sample.

*DOLLAR VALUE OF EXPENSE ITEMS IN LONG SUPPLY
(CATEGORIZED BY PRIMARY REASONS)
($ IN 000)

| | ARMY | | NAVY | | AIR FORCE | | DLA | | TOTALS |
|---|---|---|---|---|---|---|---|---|---|
| | $ Value | % | $ Value | % | $ Value | % | $ Value | % | $Value |
| Provisioning | 8,786 | 4 | 875 | 20 | 4,384 | 12 | 147 | 1 | 14,192 |
| Phase-out | 107,330 | 43 | 975 | 21 | 6,342 | 17 | 1,305 | 4 | 115,952 |
| *Other | 113,695 | 45 | 1,673 | 37 | 25,053 | 67 | 25,383 | 87 | 165,804 |
| Unknown 25,012 | 20,065 | 8 | 1,014 | 22 | 1,729 | 4 | 2,204 | 8 | |
| Total | 249,876 | | 4,537 | | 37,508 | | 29,039 | | 320,960 |
| Total $ Value Long Supply | 580,000 | | 396,000 | | 871,000 | | 612,000 | | 2,459,000 |
| Sample % | 43% | | 1% | | 4% | | 5% | | 13% |

*Chart relating to number of expense NSN's in long supply can be found in Annex D. Also included is a further breakout of "other".

As an explanation for the larger dollar figures relating to the 200 item sample used by the Army, their selection was from the items reflecting the highest dollar value of total economic and contingency retention assets. Fifty-one percent of the 107 million dollars stratified as phase-out by the Army are parts associated with individual and crew serviced weapons. This type of asset has more stringent rules and controls over disposal and retention. The other Components used a random selection technique to select the 200 line items examined.

The DLA sample attributes only 4% of the value of the long supply sample to "phase-out" because this was all that could be related to this cause with certainty. However, as shown in Annex D, their sample shows an additional 41% resulted from "short term" and "long term demand reductions", some portion of which can be presumed to result from an actual phase-down or phase-out cause. Similarly, although only 1% is attributed to provisioning, there is an additional 2% charged to "demand never developed" which undoubtedly includes provisioning.

Of the $165 million dollars shown as "other" causes, the major reasons and dollars associated, were identified as:

| | |
|---|---|
| Decreasing Demand/Requirements | $ 95 Million |
| Life of Type Buy Out | 25 Million |
| Retail Returns/Reclamation | 17 Million |
| Fluctuating Demand | 11 Million |
| Item No Longer in Long Supply | 5 Million |
| Misc. | 12 Million |
| Total | $105 Million |

Navy observed that 96% of the items in the provisioning group entered the inventory records prior to implementation of DoD Instruction 4140.42. This observation is undoubtedly true for the other Components and points out that the impact of this Instruction is not yet felt throughout the provisioning process. At ASO, of the 118,000 items in long supply, 88,000 did not meet the selection criteria. Although Navy observed

that more than 70% of the items were established in the 1960's, they and other Components were able to confirm reasons for long supply. In fact, the Sub-Group's original impressions were that the unknown category would be far greater than the data reflects.

Other impacts on the statistics that could not be displayed were the items appearing in long supply that are in subsequent points in the demand cycle not in long supply. Also, some of the long supply of each Component is a direct result of returns without credit up to maximum retention levels and is consistent with DoD policy.

The data collected and the subsequent analysis performed by the Components substantiate OMB's concern that phase-out and significant phase-down of weapon systems are a primary cause of long supply. The recommendation/conclusion that emanates from the long supply review substantiates the policy statement developed as a result of the study efforts of Task 0001 - Program Data Usage.

It has been long thought that provisioning is the most significant cause of long supply. Though a definite contributor to long supply, provisioning's importance to initial supportability of weapon systems has long been recognized. Whereas Components need to continue efforts to improve provisioning processes and engineering estimates, recognition must be given that a certain amount of provisioning assets migrating to long supply is an inherent cost of doing business in the military environment.

One of the significant contributors to long supply reflected in the data collected is the life of type buys made to accommodate those items where commercial production capability will cease to exist. As a means to assure continued support of systems to be retained by the Services, it is necessary to buy out total requirements to support the life of the systems. Currently, some of the Components have failed to stratify these assets properly and they are now reflected as long supply. Components should insure that the requirements objectives are properly constructed to preclude these assets from stratifying to long supply.

The Components' examination of a number of the sample items showed, that as a result of fluctuating demands, there were items that migrated into and out of long supply. Premature disposal could cause unnecessary recoupment or new procurements to be initiated. The Sub-Group concluded that each Component should determine that portion or percentage of long supply impacted by the above described migratory items.

This task confirmed that Components have the capability to determine in most cases, when examination is made item by item, the causes of long supply for the item being researched. By a sampling technique they can maintain stratification of the predominant causes of long supply as a means of charting progress in reducing those causes that can be influenced by improved management strategies.

This capability will also allow the policy statement promulgated by Task 0001 to be periodically reviewed for progress.

Task No. 0004 - Current Weapon Systems Management

The objective of this task was to describe the application of Weapon Systems Management concepts as currently applied in the Military Services and the Defense Logistics Agency. For uniformity and comparability the Components' management techniques are described similarly in the detailed descriptions contained in Annex D in five major segments. These segments are: identification process of relating individual items to weapon systems, organizational structure, program development and execution, management initiatives, and use of weapon systems in reporting effectiveness goals.

The Army uses a five position Financial Inventory Accounting code for each National Stock Number (NSN), the last two digits of which identify the applicable weapon system. Each NSN is also coded to reflect all applications. The primary functional directorates are organized by weapon system or grouping of systems. Separate programs are developed for each system in the provisioning process and are tracked from inception through execution by weapon system. Replenishment pro-

grams are approved at a program level and executed by weapon system. Quarterly reviews are structured to bring out problems identifiable to weapon systems enabling prioritization to eliminate troublesome areas within a weapon system. Through the MILSTEP reporting system the Army tracks logistic support availability for up to 33 key weapon systems at each ICP.

The Navy has two ICPs that manage items somewhat differently. The Navy (ASO) has two key files that relate items to weapon systems. The Master Data File, keyed by National Item Identification Number has complete application data and percent of each application. The Weapon System File has the same application data, however, its key is application. Two additional positions have been added to the cognizance code; a Special Management Identification Code that aids in identification to a weapon system. ASO's organizational structure has two main divisions. The Weapons Logistic Division manages items peculiar to the latest aircraft or equipment and the Stock Control Division manages older systems, engines, common items and support equipment. Technicians are colocated with item managers. Items are provisioned by weapon system. Initial funds are allocated and tracked by weapon system. Replenishment funds are tracked by major systems, however, common items and support equipment cannot be associated with weapon systems. There is no workload prioritization by weapon system. The four digit cog code enables Supply Materiel Availability to be tracked. Operational readiness is tracked by weapon system.

The Navy (SPCC) at time of provisioning assigns all items a Local Routing Code. Multiple applications contain the code of the original assignment. The weapon systems file contains all applications for a given stock number. SPCC is organized for weapon systems support. Provisioning is done by weapon system but the replenishment process is executed without regard to weapon system. Exceptions are for nuclear reactors, SSPO and TRIDENT materiel. Prioritization of workload is not done by weapon system. SPCC tracks Supply Materiel Availabiity monthly for 23 systems, though the inability to distribute demands for common items among systems has a slight impact on the rates.

The Air Force relates items to weapon systems in three ways; the Supply Management Code, summarizing stratification data; the Materiel Management Aggregation Code; and through application data. The Air Force employs Program Managers in pre-provisioning and System Managers within AFLC once the system is past the developmental stage. The system divisions manage peculiar airframe type items and the item management divisions manage recoverable and expense items. Initial funds are allocated and tracked by weapon system. Expense items are not managed by weapon system, nor does repair budget and execution consider weapon systems. A Logistics Support Priority shows the relative priority of the weapon system. The maintenance organization repairs components based on a sequence of repair attention to be given. AFLC is working to get backorder and fill rates by weapon system. Not mission capable and partial mission capable rates are computed by weapon system.

The Defense Logistics Agency (DLA) identifies to a weapon system those items identified by a Component as critical to operational support of 82 selected systems. Each Defense Supply Center has assigned supply, technical and procurement focal points to monitor support within that functional element. A functional office within DLA Headquarters maintains focal point responsibliity for any weapon system requiring unusual attention. Other than the provisioning process, programs are not executed by weapon system. There is no workload prioritization by weapon system. During funding austerity, every effort is made to avoid reducing support and provisioning of weapon system items. Performance goals and statistics are not separately established or collected for weapon systems currently, although plans to obtain separate statistics on service identified items are in process.

## Task No. 0005 - Weapon Systems Management For Secondary Items Conceptualization

During the development of Task 0001, Program Data Usage, it became evident that Weapon Systems Management for Secondary Items was employed in varying degrees and definited differently by each of the

Components. It was subsequently decided to begin the development of a concept paper to establish a baseline for future discussions by identifying and describing the various subsets of actions that comprise a Weapon System Concept for Secondary Items. Annex D contains this concept paper.

# Chapter IV

## Conclusions and Recommendations

Chapter III provides a detailed analysis of the Secondary Item Stockage Policy efforts including the conclusions and recommendations reached by the Working Group. This Chapter provides a summary of those conclusions and recommendations and is presented by each major area of analysis.

## A. Variable Safety Level/Economic Order Quantity

### Conclusions

Lacking specific guidance from OSD in the area of reparable item management, the Components have implemented significantly different methodologies for computing VSL/EOQ values for reparable items. The Working Group has proposed development of a DoD policy for reparable items.

There is room for increased standarization among the Components in certain areas of consumable item management. Issue papers developed by the Working Group address the areas in which greater standardization should occur.

VSL/EOQ models currently implemented by the Components contribute to long supply; however, the magnitude cannot be precisely stated as it is the function of several factors including: the demand trend for items, (i.e. increasing, decreasing or steady); the variance of inventory levels over time; and the method of demand forecasting utilized by the model. This conclusion was reached after analysis by the Working Group of several simulation runs produced by the Components.

It is not feasible, in the short-term, to exchange simulation models or data bases among the Components for the purpose

of comparing their performance. This area was investigated by the Working Group but rejected due to the prohibitive manpower resources required for its accomplishment.

## Recommendations

The Working Group's analysis of the Components' implementation of DoD Instruction 4140.39 has led to the following recommendations that should be incorporated into the next revision of the Instruction.

The forecasting of demand to be used in computing inventory levels should utilize, as a base, all demand observations except those for which the requisitions are clearly a one-time acquisition or for those requirements which are forecasted on a basis other than historical demand. One-time acquisitions refer to such demands as retail war reserve requisitions, initial outfitting requisitions, allowance change requisitions, etc.

The replacement cost used in the VSL/EOQ models should be estimated using the unit cost of the last contract of approximately the same order quantity size with authorized escalation factors applied for the time period since that contract award until the present time of levels computation.

The range rule for demand based items to be used during and after the Demand Development Period (DDP) should be the DoD Instruction 4140.42 Difference in Cost (COSDIF) equation, or an OSD-approved alternative model in which all costs and parameters are consistent with the costs and parameters used in DoD Instruction 4140.39 for the depth model.

DoD Instruction 4140.39 should be revised to state: the holding cost rate is to be applied to the average inventory position (i.e., R + Q/2). The obsolescence rate portion of the holding cost rate will be computed as an average rate over at least a five year period, computed by taking the sum

of; disposals, change in potential excess, change in contingency retention, less returns to the wholesale level without credit and dividing by the average inventory position.

The computation of the leadtime demand variance used in safety level and re-order point computations should consider both the variability of demand and the variability of procurement leadtime.

The constraint on safety level should be revised such that no item will be given a safety level of more than three standard deviations of leadtime demand.

If procurement reviews are not conducted at least daily or as transactions occur, the procurement leadtime forecast utilized in computing the re-order point should incorporate the average interval of time occurring from when assets actually reach the re-order point to the subsequent procurement review operation. For simplicity, one-half of the average interval between procurement reviews may be used. This leadtime additive value is to be treated as part of the administrative leadtime.

To insure adequacy of control by the Components in the future, DoD Instruction 4140.39 should be revised to state: values of key parameters and constraints, utilized in the computation of safety level and procurement cycle requirements and determined at a level of authority below the Component logistics headquarters (e.g., DLAHQ, AFLCHQ, NAVMATHG/NAVSUPHQ, DARCOMHQ), are to be reviewed and approved by the Component logistics headquarters.

In addition to the above recommended revisions to DoD Instruction 4140.39, the Working Group recommends initiation of the following efforts.

A study should be undertaken to resolve underlying issues in the area of demand forecasting in order to formulate and promulgate a policy directive. Underlying issues include: types of demand to be included in the forecasting bases; methodology (i.e., arithmetic averaging, exponential smoothing, etc.); time base for collecting observations; frequency of forecasting; forecasting leadtime demand variance; and use of program relationships. In addition, such a study should address the issue of which probability distribution(s) provides the most realistic distribution of leadtime demand. The study should apply to both reparable and consumable items.

A policy statement should be issued by OSD which states: Inventory Control Point (ICP) response time will be the recognized performance measure for budget formulation and execution at the wholesale level. OSD should convene a study group to recommend appropriate response time goals for ICP performance and promulgate goals as part of the Consolidated Guidance.

OSD should formulate and promulgate VSL/EOQ policy for reparable (exchangeable) items, as has been done for consumable items via DoD Instruction 4140.39. This policy should address, in addition to the areas addressed in DoD Instruction 4140.39, the repair problem as well as the procurement problem; obsolescence rates; and the treatment of serviceable and unserviceable returns in the requirements determination process.

OSD should undertake an effort regarding the use of serviceable returns in the requirements determination process which: (1) tasks each Component to study the problem of forecasting serviceable returns and utilizing such forecasts in requirements computations; (2) tasks each Component to present the findings, conclusions and recommendations of its study to OSD; (3) results in a policy statement by OSD upon analysis

of the Components' studies and the impact of the demand forecasting effort.

Due to difficulties within the Components of meeting real world resource constraints regarding the volume of procurement actions resulting from use of the VSL/EOQ model and constraints of DoD Instruction 4140.39, OSD should undertake a study to determine a policy which promulgates the most cost-beneficial means of providing required materiel support while meeting resource constraints.

The issue of obsolescence should also be addressed in conjunction with the development of weapon systems management concepts and new inventory control models. Also, consideration should be given to resolving the aspect of the time dependency of obsolescence (i.e., the probability of obsolescence over time after item or weapon system introduction).

B. Manual File Maintenance

Conclusions

All Components authorize item managers to adjust individual data elements, thereby permitting them to influence an items' procurement quantity. Analysis of Component documentation provided the basis for this conclusion by the Working Group.

Manual adjustments are controlled as part of the review and approval process applied to supply decisions, i.e., procurement, repair, cutback, disposal. This was determined from Component documentation of their ICP approval authority process. By means of an on-site review, it was determined that this process works as documented at the Army's Tank-Automotive Materiel Readiness Command (TARCOM).

Manual adjustments are considered valid and therefore, do not have an unwarranted impact on procurement quantities. Working Group interviews of TARCOM item managers and supervisors led to this conclusion.

Benefits to be gained from additional management reviews by the Working Group were considered to be marginal. Even if problems were found at other ICPs, the most likely result would be a tightening of controls over the manual adjustment process. This action has been recommended by the Working Group.

### Recommendations

Each DoD Component should have a method for identifying those manual adjustments that would impact supply decisions.

ICP management should, on a recurring or as required basis, review manual adjustments to insure compliance with Component and DoD policies.

Each DoD Component Headquarters should conduct periodic materiel management reviews of its ICPs, to include review of manual adjustments.

Audit agencies should be informed that DoD Components will have the ability to identify manual adjustments that impact supply decisions.

## C. Non-Demand Based Stockage Policies

### Conclusions

Uniform definitions, applicable to sub-categories of demand and non-demand based items, are required to permit valid comparative quantification, utilization of more meaningful

performance measures and implementation of more effective management policies for demand and non-demand based items. The Working Group has proposed uniform definitions for DoD-wide application.

Working Group documentation of current Component definitions, policies and procedures for managing non-demand based items clearly shows there are significant inconsistencies among the Components in these areas. The OMB contention that current DoD policies do not provide incentives for minimizing, investment in non-demand based inventories is partially correct in that there are inadequate DoD policies for managing this type of inventory. The Working Group has developed proposed policy statements to help resolve current policy deficiencies.

OMB's analysis of "hedge stocks" failed to recognize the different types of inventories included in their overall categorization. Furthermore, OMB failed to consider that the non-demand based portion of "hedge stocks" is differently defined, computed and managed by each Component. The Working Group's analysis more consistently quantified the non-demand based portion of "hedge stocks" and addresses OMB allegations regarding management of VSL/EOQ inventories and non-demand based inventories as separate issues.

The Working Group's quantification of non-demand based items indicates this category comprises 35.0% of all secondary items in DoD's wholesale supply system, while the dollar value of inventory investment represents 13.8% of secondary item investment.

Non-demand based items account for only 5.0% of the total value of annual demand. However, as non-demand based items inherently have low-actual demand occurrences, justification of stockage must fully consider such factors as item

essentiality. The Working Group has drafted a concept paper for use as the basis for DoD-wide application of essentiality coding for secondary items.

A performance measure applicable to the total range of supply system inventories, which may be utilized in a stockage model and expressed in terms of predetermined objectives, is the most desirable method to measure the contribution of item investment.

"Response time" is considered to be the most appropriate measure of supply performance relative to inventory investment. The Working Group has developed a response time measure, tailored to non-demand based items, and has quantified on a one-time basis, the contribution of these items to supply performance.

Non-demand based items contribute significantly to materiel support objectives as measured by response time. Using FY 1980 data, the Working Group demonstrated that DoD achieved a 36.2% reduction in response time from an inventory investment in non-demand based items of 13.8% of total investment of secondary items. Therefore, the OMB allegation questioning the contribution of non-demand based stockage is invalid in terms of supply performance.

The OMB proposed alternative to not stocking non-demand based items--re-investing the resources in demand based items--is infeasible. Current investments are "sunk" costs and cannot be re-invested. Large reductions in future non-demand based investment would result in significant increases in overall response times which could not be offset by demand based item investment. Further, to the degree stockage of non-demand based items supports end item operational readiness, elimination of these stocks would adversely impact operational performance.

Current MILSTEP reporting does not accommodate data collection required to measure response time for demand and non-demand based items.

## Recommendations

Using the proposed definitions and policy statements as contained in this Report, OASD(MRA&L) should develop and issue a DoD Instruction which specifically addresses Non-Demand Based Stockage Policies and to include, as a minimum, the areas of definitions, selection criteria, requirements objectives, review and classification, retention level, stratification and management.

Based on the response time measure developed in this Report, OASD(MRA&L) should take action to expand the use of "response time" in evaluating supply performance for all items including non-demand based items.

As a follow-on action to the use of response time as a measure for supply performance, OASD(MRA&L) should pursue the development of a "response time" model which will permit determination of stockage levels which represent the most efficient investment of resources given an approved response item objective.

To permit use of a response time measure on a permanent basis, OASD(MRA&L) should initiate changes to MILSTEP in order for the Components to collect ICP Availability Determination response times for both demand and non-demand based items.

OASD(MRA&L) should initiate an effort to insure DoD-wide implementation of a uniform essentiality coding system for secondary items. As a first step a DoD Instruction on essentiality should be prepared and issued. The Essentiality

Concept Paper in Annex C should be used as the basis for this Issuance.

D. Weapon Systems Relationships

Conclusions

The study confirms that all DoD Components have developed a computational base for the purpose of acquiring the level of parts and components expected to support new systems in their initial and early years of deployment.

All DoD Components, with the exception of DLA, have a capability in varying degrees to employ program data in developing forecasted requirements. Subsequent to initial provisioning, support of growing operational systems relies on the use of program data to accommodate the continuing increase in requirements.

Program data was determined to be useful where a weapon system is being phased-out or significantly phased down over a relatively short time span.

More emphasis by the Components is needed to improve present management methods of reacting to phase-out/phase-down.

During provisioning, all Military Services identify essential items applicable to a new weapon system.

Use of essentiality data varies by each Component and integration into each system requires significant differences and sophistication.

The literature search indicates that treatment of essentiality as an integral segment of requirements computations is a

military unique subject.

A sample analysis of long supply expense items confirmed that phase-out and significant phase-down of weapon systems are a primary cause of long supply.

Other significant, identifiable main contributors to long supply were life-of-type buys, however, some Components failed to properly construct the requirements objectives to assure proper stratification.

Provisioning was a definite contributor to long supply, however, it did not reflect the contribution imagined at the onset of the study. Migratory items, (in and out of long supply) contributed to long supply.

The study concluded that development of a "Concept for Weapons Systems Management For Secondary Items" was needed as a platform for discussions and future initiatives.

## Recommendations

Based on the data confirmed by this study, Components should identify significant declining or total phase-out programs and insure that Service initiatives recognize facets that contribute to long supply.

Recognizing the value of program data to the development of requirements objectives, DLA should continue its efforts to complement exponential smoothing by its use.

Subsequent to Military Service development of detailed information on phase-down/phase-out of weapon systems, this information should be furnished to DLA and other supporting Components.

The Components should continue current programs and planned actions to incorporate the use of essentiality data in requirements computations. These unilateral developments will assist in the evaluation of essentiality use in future DoD efforts to study this area.

Though provisioning was not the most significant contributor to long supply, Components should continue their efforts to improve provisioning processes.

The research of long supply causes confirmed that life-of-type buys are stratified improperly. Components should insure that requirements objectives for life-of-type buys are properly constructed to preclude these assets from stratifying to long supply.

As another action in the long supply area, Components should investigate the possibility of determining that portion or percentage of long supply caused by items inadvertently migrating into and out of long supply.

# APPENDIX A

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D C 20301

SR
MANPOWER
RESERVE AFFAIRS
AND LOGISTICS

August 13, 1979

MEMORANDUM FOR THE ASSISTANT SECRETARY OF THE ARMY (IL&FM)
ASSISTANT SECRETARY OF THE NAVY (MRA&L)
ASSISTANT SECRETARY OF THE AIR FORCE (RD&L)
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Analysis of DoD Secondary Item Stockage Policies

During their review of the FY 1980 Defense Budget, the Office of Management and Budget (OMB) raised a number of "supply efficiencies" issues that they used to justify substantial reductions in DoD's FY 1980 budget and outyear funding projections. While we have disagreed strongly with the near-term executability of--and estimated savings from--these "efficiencies," several of them clearly identify aspects of current DoD supply management that need a fresh look.

Two key issues raised by OMB are:

a. The amount of so-called "hedge" stocks (i.e., safety levels, non-demand based levels and insurance stocks) being procured and held in DoD inventories.

b. Materiel retention and disposal policies. Here OMB suggests that more detailed and explicit economic retention criteria should be developed and that a major fraction of stocks now held for contingency purposes should be sold off.

As the analysis of these two issues will require significant effort over an extended period, I am establishing a Joint Office of the Secretary of Defense/Service/Defense Logistics Agency Steering Group to oversee these two analytical efforts. The Steering Group will be chaired by the DASD (Supply, Maintenance and Services) (SM&S); the DASD (Requirements, Resources and Analysis) will be vice-chairman. I expect to invite OMB to provide an observer on the Steering Group.

The two analytical efforts will be conducted separately. I now envision the "hedge" stock study being accomplished largely in-house by an ad hoc working group, supported by independent in-Service and possibly contractor

assistance. The retention/disposal analysis will be conducted as a contractor study under the auspices of the Steering Group. Enclosures 1 and 2 are preliminary outlines of each study effort with tentative milestones.

Please identify your Steering Group representative to the DASD(SM&S) not later than 10 days from the date of this memorandum. Your representative will be notified later of the specific time and place of the initial Steering Group meeting.

I would appreciate your personal attention to this matter, which will continue to be of major interest to DoD and OMB through the upcoming FY 81 budget reviews.

Enclosures
As stated

(signed)
ROBERT B. PIRIE, JR.
Assistant Secretary of Defense
(Manpower, Reserve Affairs & Logistics)

ENCLOSURES NOT INCLUDED

# APPENDIX B

## STOCKAGE POLICY WORKING GROUP MEMBERS

| | NAME/ORG/GRADE | TELEPHONE NO. |
|---|---|---|
| Chairman | Robert F. Rozycki, OSD, SES | 697-4186 |

### VSL/EOQ & Manual File Maintenance Sub-Groups

| | | |
|---|---|---|
| Chairman VSL/EOQ | Larry R. Atkinson, Navy/OSD, CDR | 695-4508 |
| Chairman File Main. | Buford F. Taylor, DLA, GS 14 | 274-7541 |
| | Charles H. Ferguson, OSD, GS15 | 695-5145 |
| | Jere L. Engelman, Navy, GS12 | 8-430-2337 |
| | Jerome W. Kaple, AF, GS13 | 8-787-3407 |
| | W. Karl Kruse, Army, GS12 | 8-444-3808 |
| | John H. McAlpin, Navy, GS12 | 625-6865 |
| | Michael R. Pouy, DLA, GS13 | 274-7227 |
| | James W. Sari, Navy, GS13 | 8-430-2337 |
| | John D. Waits, AF, GS12 | 8-787-3407 |
| | Barbara A. Arnold, AF, GS12 | 8-787-3180 |
| | Carol A. Hawks, AF, GS12 | 8-787-3180 |

### Non-Demand Based Sub-Group

| | | |
|---|---|---|
| Chairman | Diann Lawson, AF, GS13 | 8-787-3180 |
| | James H. Reay, OSD, GS15 | 697-0345 |
| | Bruce R. Faurie, Navy, LCDR | 8-430-3725 |
| | William R. Frazier, DLA, CPT | 274-7080 |
| | James L. Fleck, AF, GS13 | 8-787-6920 |
| | Raymond M. Kristy, AF, GS14 | 695-4514 |
| | Joyce K. Lerch, Navy, GS13 | 8-430-2588 |
| | Daniel J. Maksymowicz, Army, GS12 | 8-273-2259 |
| | Dennis L. Zimmerman, DLA, GS14 | 274-7227 |
| | W. Dean Free, Navy, LCDR | 695-4508 |

### Weapon System Relationships Sub-Group

| | | |
|---|---|---|
| Chairman | William O. Higgins, Army, GS14 | 274-9801 |
| | John F. Olio, OSD, CDR | 697-6079 |
| | Tim J. Allega, Navy, LCDR | 8-430-4321 |
| | Philip M. Goldstein, Navy, GS13 | 695-4619 |
| | David L. H. Holmes DLA, GS15 | 274-6266 |
| | Keith W. Lippert, Navy, LCDR | 8-430-4321 |
| | Margaret A. McCormick, Navy, GS12 | 8-442-2169 |
| | Joe W. Towell, AF, GS13 | 8-787-3819 |

### Contractual Assistance Provided by C.A.C.I., Inc-Federal

| | | |
|---|---|---|
| | William J. Bush, CACI | 841-3723 |
| | Rowland D. Lewis, CACI | 841-7938 |
| | Sidney Weinberg, CACI | 841-4665 |

# APPENDIX C

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D C 20301

SR
MANPOWER,
RESERVE AFFAIRS
AND LOGISTICS

4 December 1979

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (IL&FM)
ASSISTANT SECRETARY OF THE NAVY (MRA&L)
ASSISTANT SECRETARY OF THE AIR FORCE (RD&L)
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Analysis of DoD Secondary Item Stockage Policies

In my memorandum of August 13, 1979 on DoD Stockage Policies, I established a joint Steering Group to oversee two analytical efforts to respond to issues raised by the Office of Management and Budget (OMB) in the FY 80 Defense Budget. The first of these, the analysis of our inventory retention policies and practices, is being conducted by American Management Systems, a private contractor. The second effort, an analysis of DoD stockage policy, will be accomplished with resources provided by all the Services, the Defense Logistics Agency (DLA) and my Office.

A working group made up of Service, DLA, and OSD representatives has developed a detailed set of tasks to accomplish the stockage policy analysis. The tasking papers define and scope each issue and provide methodology, resource requirements and milestones for task accomplishment. The tasks are divided into four major groupings. Those dealing with the Variable Safety Level/Economic Order Quantity (VSL/EOQ) issues will be chaired by the Navy (Enclosure 1); manual file maintenance changes will be chaired by DLA (Enclosure 2); non-demand based stockage policy tasks will be chaired by the Air Force (Enclosure 3); and the tasks on weapon systems relationships will be chaired by the Army (Enclosure 4). Each major group will be monitored by a member of my staff. R. F. Rozycki is the overall chairman of this effort.

The effort that we have jointly laid out is quite substantial. It will require the application of an extensive portion of our analytical resources in the field of supply management over a short period of time. However, we believe this investment in resources should receive a high priority in view of the potential for achieving significantly more effective supply management and to preclude further OMB issues in the FY 82 Defense Budget review. This analysis effort will consist of the

individuals already assigned, additional personnel as required and automated data processing resources. The Steering group will monitor the overall progress of task accomplishment and is responsible for making the final recommendations to me. A target date of August 31, 1980 has been established for completion of the short-range efforts associated with the stockage policy analysis.

Your continued support of these analysis tasks is greatly appreciated.

Enclosures
As stated

(signed)

ROBERT B. PIRIE, JR.
Assistant Secretary of Defense
(Manpower, Reserve Affairs & Logistics)

ENCLOSURES NOT INCLUDED

# APPENDIX D

STOCKAGE POLICY ANALYSIS PLAN OF ACTION AND MILESTONES

MAJOR SUBJECT: Variable Safety Level & Economic Order Quantity

POINT OF CONTACT: CDR Atkinson (Navy)

| TASK NO. | ISSUE | SUB-TASK NO. | SUB-TASK SCOPE | MILESTONES JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | Components Implementation of DODI 4140.39 | A | Preliminary Documentation | C | | | | | | | |
| | | B | Identify Inconsistencies | C | | | | | | | |
| | | C | Presentation (SG) | | C | | | | | | |
| | | D | Presentation (WG) | | C | | | | | | |
| | | E | Longterm Effort Identification | | C | | | | | | |
| | | F | *Finalize Documentation* | | | | | | | C | |
| | | G | Resolve Policy Issues For: Non-recurring Demand, Serviceable Returns, Replacement Cost, Range Rule, Obsolescence Rate, Goals | | | | | C | | | |
| | | H | EOQ/VSL Constraint Proposal | | | | | | | C | |
| | | I | Resolve Policy Issues For: Leadtime, Leadtime Demand Variance, Probability Distribution Assumptions, Procurement Cycle Lag Time, Demand Forecasting | | | | | | | C | |
| | | J | *Commence Work on Policy Outline* | | | | C | | | | |
| | | K | Complete Policy Outline | | | | | | | | C |
| | | L | Follow-on Effort Identification | | | | | | | | C |
| 0002 | VSL/EOQ Values, Parameters, Constraints & Controls | A | Preliminary Documentation of Values | C | | | | | | | |
| | | B | Preliminary Documentation of Controls | C | | | | | | | |
| | | C | Presentation (SG) | C | | | | | | | |
| | | D | Presentation (WG) | | C | | | | | | |
| | | E | Initial ICP Review of Controls/Values | | | | C | | | | |
| | | F | Complete Documentation of Values | | | | | | | C | |
| | | G | Complete Documentation of Controls | | | | | | | | C |
| | | H | Finalize Policy Statement of Values/ Controls | | | | | | | | C |
| | | I | Comparison Analysis | | | | | | | C | |

C = TASK COMPLETED F = FOLLOW-ON EFFORT

STOCKAGE POLICY ANALYSIS PLAN OF ACTION AND MILESTONES

MAJOR SUBJECT: Variable Safety Level & Economic [illegible] Quantity

POINT OF CONTACT: CDR Atkinson (Navy)

| TASK NO. | ISSUE | SUB-TASK NO. | SUB-TASK SCOPE | MILESTONES JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0003 | Impact on [illegible] Supply as Implemented | A | Determination of How to Accomplish, Milestones and Resources | C | | | | | | | |
| | | B | Presentation (WG) | | C | | | | | | |
| | | C | Determine/Define: Item Selection/Item Input, Output & Measures, Feasibility & Medium of Date Exchange | | | | C | | | | |
| | | D | Complete Initial Runs | | | | | | | C | |
| | | E | Complete All Runs | | | | | | | | C |
| | | F | Complete Analysis & Documentation to include previous forecasting/levels modeling | | | | | | | | C |

C = TASK COMPLETED F = FOLLOW-ON EFFORT

STOCKAGE POLICY ANALYSIS PLAN OF ACTION AND MILESTONES

MAJOR SUBJECT: Manual File Maintenance

POINT OF CONTACT: Bill Taylor (DLA)

| TASK NO. | ISSUE | SUB-TASK NO. | SUB-TASK SCOPE | MILESTONES JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | Data Elements Susceptible to Manual Change | A | Documentation | C | | | | | | | |
| | | B | Presentation (SG) | C | | | | | | | |
| | | C | Presentation (WG) | | C | | | | | | |
| | | D | Finalize Documentation | | | | C | | | | |
| 0002 | Levels of Approval Authority | A | Documentation | C | | | | | | | |
| | | B | Presentation (SG) | C | | | | | | | |
| | | C | Presentation (WG) | | C | | | | | | |
| | | D | Finalize Documentation | | | | C | | | | |
| 0003 | Impact of Manual File Maintenance Changes | A | Perform Initial ICP Management Review | | | | C | | | | |
| | | B | Presentation (WG) | | | | C | | | | |
| | | C | Decision on Further Effort | | | | | C | | | |
| | | D | Quantification/Policy | | | | | | | C | |
| | | E | Draft Final Report | | | | | | | | C |

C = TASK COMPLETED

F = FOLLOW-ON EFFORT

STOCKAGE POLICY ANALYSIS PLAN OF ACTION AND MILESTONES

MAJOR SUBJECT: Non-Demand Based Stockage Policies

POINT OF CONTACT: Diann Lawson (Air Force)

| TASK NO. | ISSUE | SUB-TASK | | MILESTONES | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NO | SCOPE | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG |
| 0001 | Current Definitions Policies and Quantifications | A | Document Policies | C | | | | | | | |
| | | B | Prepare Data Call | C | | | | | | | |
| | | C | Presentation (WG) | | C | | | | | | |
| | | D | Data Collection/Presentation (WG) | | | | C | | | | |
| | | E | Determine Inconsistencies | | | | | C | | | |
| 0002 | Contribution to Approved Support Objectives | A | Material Support Measures | C | | | | | | | |
| | | B | Define Data Call | C | | | | | | | |
| | | C | Status Report (WG) | | C | | | | | | |
| | | D | Complete Data Call | | | | C | | | | |
| | | F | Status Report (WG) | | | | C | | | | |
| | | F | Analyze Data | | | | | | C | | |
| | | G | Data Analysis Model | | | | | | C | | |
| 0003 | Develop Data Stockage Policy | A | Assimilate Current Policies | | | | | | C | | |
| | | B | Assess Level of Detail | | | | | | C | | |
| | | C | Prepare Policy | | | | | | C | | |
| | | D | Presentation (WG) | | | | | | | C | |
| | | E | Draft Final Report | | | | | | | | C |
| 0004 | Identify Areas For Follow-on Study | A | Potential Improvements | | | | | | | C | |
| | | B | Literature Search | | | | | | | C | |
| | | C | Future Studies | | | | | | | | C |

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STOCKAGE POLICY ANALYSIS PLAN OF ACTION AND MILESTONES

MAJOR SUBJECT: Weapon Systems Relationships

POINT OF CONTACT: Bill Higgins(Army)

| TASK NO. | ISSUE | SUB-TASK NO. | SUB-TASK SCOPE | MILESTONES JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0001 | Program Data Usage | A | Survey Existing Systems | C | | | | | | | |
| | | B | Documentation | C | | | | | | | |
| | | C | Presentation (WG) | | C | | | | | | |
| | | D | Develop Policy | | | C | | | | | |
| | | E | Presentation (WG) | | | | C | | | | |
| | | F | Draft Final Report | | | | | | C | | |
| | | G | Analyze Systems | | | | | | | | F |
| | | H | Recommend Policy | | | | | | | | F |
| | | I | Validity of Program Factors Vs. Demand Trend | | | | | | | | F |
| 0002 | Item Essentiality Coding (Needs Steering Group Decision) | A | Document VSL Impact | | | (See VSL/EOQ - Task 0001) | | | | | |
| | | B | Document Use/Non-Use | C | | | | | | | |
| | | C | Presentation (WG) | | C | | | | | | |
| | | D | Literature Search | | | C | | | | | |
| | | E | Presentation | | | | C | | | | |
| | | F | Draft Final Report | | | | | | | | C |
| 0003 | Long Supply Trends & Contributory Factors | A | Develop Historical Trends | C | | | | | | | |
| | | B | Determine Subjective Contributory Factors | C | | | | | | | |
| | | C | Presentation (WG) | | C | | | | | | |
| | | D | Quantify Long Supply Factors | | | | | | C | | |
| | | E | Presentation (WG) | | | | | | | C | |
| 0004 | Weapon Systems Management Conceptualization | A | Document Concept | | | | | | | C | |
| | | B | Adaptation - Long Range | | | | | | | | F |
| 0005 | Current Weapons System Management Actions | A | Document Associated Management Actions | | | | C | | | | |
| | | B | Document Planned Management Actions | | | | C | | | | |

C = TASK COMPLETED F = FOLLOW-ON EFFORT

# APPENDIX E

SECONDARY ITEM STOCKAGE POLICY

Glossary of Terms

| | |
|---|---|
| AAC | Aquisition Advice Code |
| ADP | Automatic Data Processing |
| AFAO | Approved Force Acquisition Objective |
| AFLC | Air Force Logistics Command |
| AFSC | Air Force Systems Commend |
| AINAC | Application Identification Number Activity Code |
| ALC | Air Logistics Center |
| ALT | Administrative Leadtime |
| ANRDP | Applicable Nonrecurring Demand Percentage |
| AMD | Average Monthly Demand |
| AQD | Average Quarterly Demand |
| ASCC | Aviation Supply Control Center |
| ASD(MRA&L) | Assistant Secretary of Defense, Manpower, Reserve Affairs and Logistics |
| ASL | Authorized Stockage List |
| ASO | Aviation Supply Office |
| AVCAL | Aviation Consolidated Allowance List |
| BLSS | Base Level Self Sufficiency |
| BRF | Best Replacement Factor |
| BSO | Budget Support Objective |
| CASREP | Casualty Report |
| CCSS | Commodity Command Standard System |
| CLAMP | Closed Loop Aeronautical Management Program |
| CNO | Chief, Naval Operations |
| COG | Cognizance |
| CONUS | Continental United States |

SECONDARY ITEM STOCKAGE POLICY

Glossary of Terms

| | |
|---|---|
| CO-OP | Cooperative Logistics (Foreign Military Sales) |
| COSAL | Coordinated Shipboard Allowance List |
| COSDIF | Cost Differential |
| DAR | Data Automation Requirement |
| DARCOM | US Army Materiel Development and Readiness Command |
| DB | Demand Based |
| DCSC | Defense Construction Supply Center |
| DDF | Due In/Due Out File |
| DESC | Defense Electronics Supply Center |
| DDI | Demand Development Interval |
| DDP | Demand Development Period |
| DGSC | Defense General Supply Center |
| DISC | Defense Industrial Supply Center |
| DLA | Defense Logistics Agency |
| DLM | Depot Level Maintenance |
| DoD | Department of Defense |
| DODI | Department of Defense Instruction |
| DOF | Depot Overhaul Factor |
| DOTM | Due Out to Maintenance |
| DPEM | Depot Purchased Equipment Maintenance |
| DPML | Deputy Program Manager for Logistics |
| EAA | End Article Application |
| EOQ | Economic Order Quantity |
| ERQ | Economic Repair Quantity |
| ERRC | Expendability, Repairability, Recoverability Code |
| ES | Equipment Specialist |

SECONDARY ITEM STOCKAGE POLICY

Glossary of Terms

| | |
|---|---|
| ESOC | Emergency Supply Operations Center |
| FBM | Fleet Ballistic Missile |
| FFG | Guided Missile, Frigate |
| FIA | Financial Inventory Accounting |
| FILL | Fleet Issue Load List |
| FMS | Foreign Military Sales |
| FSC | Federal Supply Code |
| GSE | Ground Support Equipment |
| HPMSK | High Priority Mission Support Kit |
| HSC | Hardware Systems Command |
| ICC | Item Category Code |
| ICP | Inventory Control Point |
| IM | Inventory Manager/Item Manager |
| IMPC | Inventory Management Processing Code |
| IRO | Inventory Research Office |
| ISSL | Initial Spares Support List |
| LRC | Local Routing Code |
| LSP | Logistic Support Priority |
| LRU | Line Replaceable Unit |
| MA | Marginal Analysis |
| MAD | Mean Absolute Deviation |
| MDF | Master Data File |
| MDS | Model, Design, Series |
| MEC | Military Essentiality Coding |
| MF | Maintenance Factor |
| MIEC | Mission Item Essentiality Code |

SECONDARY ITEM STOCKAGE POLICY

Glossary of Terms

| | |
|---|---|
| MILSTEP | Military Supply and Transportation Evaluation Procedures |
| MILSTRAP | Military Standard Transaction Reporting and Accounting Procedures |
| MISTR | Management Items Subject to Repair |
| MMAC | Materiel Management Aggregation Code |
| MRU | Minimum Replacement Unit |
| MTIS | Material Turned Into Store |
| NAVAIR | Naval Air Systems Command |
| NAVELEX | Naval Electronics Systems Command |
| NAVSEA | Naval Sea Systems Command |
| NAVSUP | Naval Supply Systems Command |
| NDB | Non-Demand Based |
| NHA | Next Higher Assembly |
| NIIN | National Item Identification Number |
| NMCS | Not Mission Capable, Supply |
| NRFI | Not Ready For Issue |
| NRSO | Numeric Retention Stockage Objective |
| NRTS | Not Repairable This Station |
| NSN | National Stock Number |
| NSNMDR | National Stock Number Master Data Record |
| NSO | Numeric Stockage Objective |
| OIM | Organization Intermediate Maintenance |
| OSI | Operational Support Inventory |
| OWST | Order and Ship Time |
| OWRM | Other War Readiness Material |
| PA | Program Authorization |

SECONDARY ITEM STOCKAGE POLICY

Glossary of Terms

| | |
|---|---|
| PCF | Program Change Factor |
| PCFAC | Program Change Factor Applicability Code |
| PDM | Programmed Depot Maintenance |
| PLT | Procurement Lead Time |
| PM | Program Manager |
| PMCS | Partial Mission Capable, Supply |
| PMD | Program Management Directive |
| POS | Peacetime Operating Stock |
| PPR | Planned Program Requirement |
| PROG | Program Requirements |
| QFD | Quarterly Forecast Demand |
| QFR | Quarterly Forecast Return |
| QPA | Quantity per Article |
| RC | Reorder Cycle |
| RFI | Ready For Issue |
| RO | Reorder Point |
| SAC | Strategic Air Command |
| SC | Stock Control (Division) |
| SL | Safety Level |
| SM | System Manager |
| SMA | System or Supply Material Availability |
| SMC | System or Supply Management Code/Study Method Code |
| SMIC | Special Management Identification Code |
| SPCC | Ships Parts Control Center |
| SPR | Special Program Requirements |
| SRA | Shop Replaceable Assembly |

SECONDARY ITEM STOCKAGE POLICY

Glossary of Terms

| | |
|---|---|
| SRU | Shop Replaceable Unit |
| SSPO | Strategic Systems Project Office |
| TAC | Tactical Air Command |
| TACAMO | A manned communication relay link to strategic forces. Acronym stands for "Take Charge and Move Out" |
| TARCOM | U.S. Army Tank-Automotive Materiel Readiness Command |
| TAT | Turn Around Time |
| TDV | Total Dollar Value |
| TIR | Transaction Item Reporting |
| TSARCOM | U.S. Army Troop Support, Aviation Readiness Command |
| TVC | Total Variable Cost |
| UICP | Uniform Inventory Control Programs |
| USAF | United States Air Force |
| USAFE | United States Air Force, Europe |
| VAD | Value of Annual Demand |
| VSL | Variable Safety Level |
| WL | Weapons Logistic (Division) |
| WRA | Weapon Replaceable Assembly |
| WRSK | War Readiness Spares Kit |
| WSF | Weapon System File |
| WSSP | Weapon System Support Program |